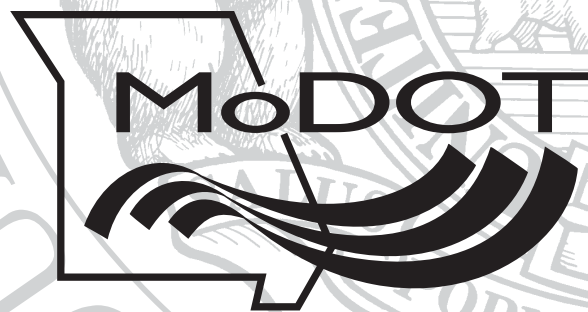

2020 Missouri Standard Plans for Highway Construction

Missouri Department of Transportation



This set of standard plans has been approved by the Missouri Highways and Transportation Commission for highway construction projects and constitutes a contract document in accordance with Section 101.2 of the Standard Specifications for Highway Construction.

This set of Standard Plans is effective beginning with the October 2042 bid opening.

www.modot.org/business/standards_and_specs/standardplans.htm

EFFECTIVE: 10/01/2020

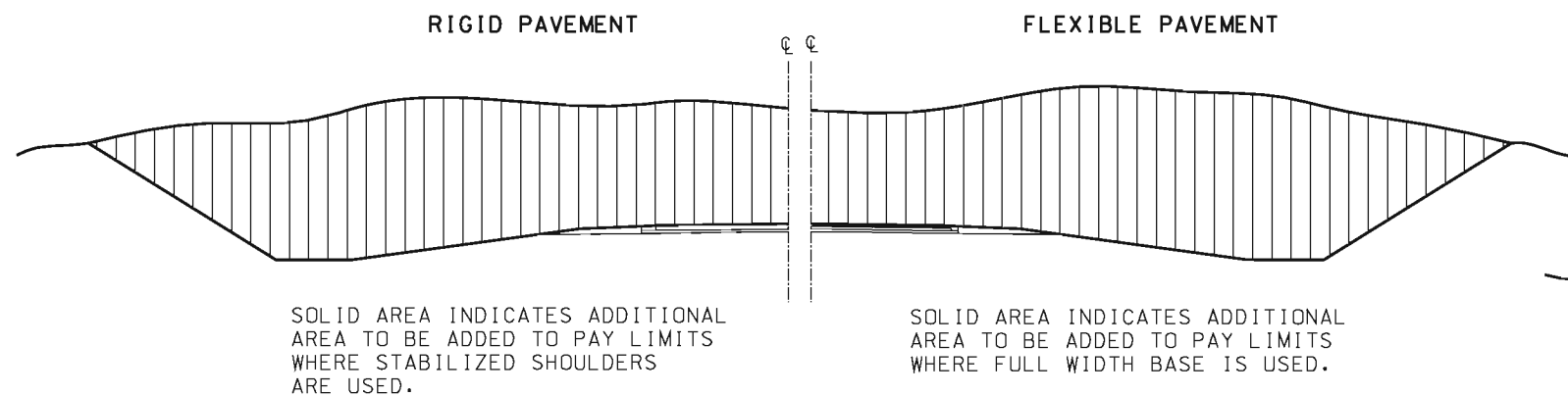
| STANDARD NO. | DRAWING TITLE | NO. OF SHEETS | EFFECTIVE DATE |
|--------------|---|---------------|----------------|
| 203.00E | EXCAVATION AND EMBANKMENT – TYPICAL DETAILS | 1 | 08/01/1998 |
| 203.02F | UNDERGRADING – TYPICAL DETAILS | 2 | 01/01/2004 |
| 203.10D | TABULATED EARTHWORK AND SECTION DATA | 1 | 02/01/2009 |
| 203.20G | SUPERELEVATION, SPIRALS AND WIDENING (UNDIVIDED HIGHWAY) | 4 | 07/01/2017 |
| 203.21K | SUPERELEVATION, SPIRALS AND WIDENING (DIVIDED HIGHWAY) | 3 | 07/01/2017 |
| 203.22 | SUPERELEVATION, SPIRALS AND WIDENING | 2 | 07/01/2018 |
| 203.35A | MAILBOX TURNOUTS | 1 | 08/01/1981 |
| 203.40G | TYPICAL DETAILS ON AND OFF RAMP | 2 | 10/01/2007 |
| 203.41F | TYPICAL DETAILS ON AND OFF RAMPS (ROADWAY WITH 6:1 FORESLOPE) | 2 | 01/01/1995 |
| 203.50N | TYPICAL MEDIAN OPENINGS (DIVIDED HIGHWAYS) | 2 | 04/01/2016 |
| 203.61B | DRIVEWAY – TYPE I | 1 | 07/01/2020 |
| 203.62E | DRIVEWAY – TYPE II | 2 | 07/01/2020 |
| 203.63C | DRIVEWAY – TYPE III | 2 | 07/01/2020 |
| 203.64E | DRIVEWAY – TYPE IV | 2 | 07/01/2020 |
| 203.65B | DRIVEWAY – TYPE V | 1 | 07/01/2020 |
| 204.00D | EMBANKMENT CONTROL – MEASURING DEVICES | 1 | 04/01/1983 |
| 204.30 | PORE PRESSURE MEASUREMENT DEVICES | 1 | 03/01/1996 |
| 401.00C | TYPE A2 AND A3 SHOULDERS, SAFETY EDGE SM | 3 | 07/01/2018 |
| 413.20 | SCRUB SEAL BROOM CONFIGURATION | 1 | 07/01/2004 |
| 502.05P | CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15 FT. JOINT SPACING | 4 | 10/01/2020 |
| 502.10K | DOWEL SUPPORTING UNITS | 2 | 06/01/2010 |
| 504.00K | CONCRETE APPROACH PAVEMENT | 3 | 10/01/2020 |
| 602.00D | RIGHT-OF-WAY AND DRAIN MARKERS | 2 | 01/01/2003 |
| 604.05D | PIPE CULVERT HEADWALLS – TYPES S | 2 | 08/01/2006 |
| 604.10E | PIPE CULVERT HEADWALLS – ENERGY DISSIPATOR FOR 18" CONCRETE PIPE | 1 | 07/01/2001 |
| 604.11E | PIPE CULVERT HEADWALLS – ENERGY DISSIPATOR FOR 24" CONCRETE PIPE | 1 | 07/01/2001 |
| 604.12E | PIPE CULVERT HEADWALLS – ENERGY DISSIPATOR FOR 30" CONCRETE PIPE | 1 | 07/01/2001 |
| 604.13E | PIPE CULVERT HEADWALLS – ENERGY DISSIPATOR FOR 36" CONCRETE PIPE | 1 | 07/01/2001 |
| 604.14E | PIPE CULVERT HEADWALLS – ENERGY DISSIPATOR FOR 42" CONCRETE PIPE | 1 | 07/01/2001 |
| 604.15E | PIPE CULVERT HEADWALLS – ENERGY DISSIPATOR FOR 48" CONCRETE PIPE | 1 | 07/01/2001 |
| 604.29C | DROP INLET- TYPE X | 2 | 04/01/2018 |
| 604.30G | CONCRETE MANHOLES | 2 | 02/01/2009 |
| 604.40F | PIPE COLLARS | 2 | 10/01/2000 |
| 604.70 | SLOTTED DRAIN | 2 | 03/01/1994 |
| 605.10I | PAVEMENT UNDERDRAINAGE | 4 | 06/01/2013 |
| 606.00AY | GUARDRAIL | 7 | 01/01/2020 |
| 606.01F | MEDIAN PIER PROTECTION | 9 | 08/01/2012 |
| 606.22U | BRIDGE ANCHOR SECTION – SAFETY BARRIER CURB ON BRIDGE | 6 | 07/01/2016 |
| 606.23J | BRIDGE ANCHOR SECTION - THREE BEAM RAIL ON BRIDGE | 5 | 07/01/2016 |
| 606.30K | GUARDRAIL - TERMINAL ANCHOR ENDS | 7 | 04/01/2017 |
| 606.31B | CRASHWORTHY END TERMINALS – TYPE A – GRADING LIMITS | 1 | 10/01/2019 |
| 606.40D | ONE-STRAND ACCESS RESTRAINT CABLE | 2 | 07/01/2004 |
| 606.41L | THREE-STRAND GUARD CABLE | 7 | 04/01/2019 |
| 606.50D | MIDWEST GUARDRAIL SYSTEM (MGS) | 8 | 01/01/2019 |
| 606.51 | MIDWEST GUARDRAIL SYSTEM (MGS) – MEDIAN PIER PROTECTION | 2 | 04/01/2018 |

[illegible]

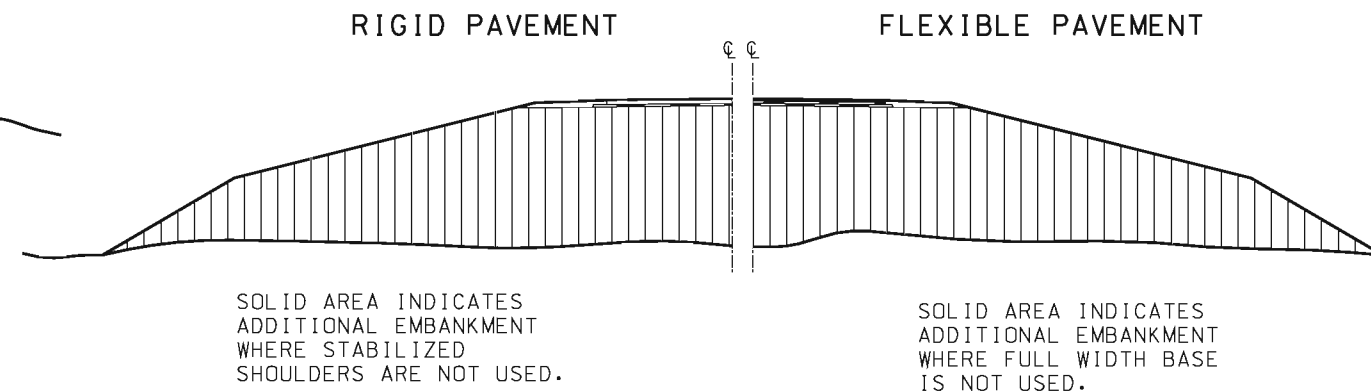
EFFECTIVE: 10/01/2020

| STANDARD NO. | DRAWING TITLE | NO. OF SHEETS | EFFECTIVE DATE |
|--------------------------|---|---------------|----------------|
| 703.10J | CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (SQUARED) | 3 | 07/01/2015 |
| 703.11J | CONCRETE SINGLE BOX CULVERT – FLARED WINGS (SQUARED) | 3 | 07/01/2015 |
| 703.12J | CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE) | 3 | 07/01/2015 |
| 703.13J | CONCRETE SINGLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE) | 3 | 07/01/2015 |
| 703.14J | CONCRETE SINGLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE) | 3 | 07/01/2015 |
| 703.15E | CONCRETE SINGLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE) | 3 | 07/01/2015 |
| 703.16 | CONCRETE SINGLE BOX CULVERT – CUT SECTIONS | 1 | 04/01/2011 |
| 703.17 | CONCRETE SINGLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT | 14 | 04/01/2011 |
| 703.37C | CONCRETE BOX CULVERT – EXTERIOR WING REINFORCEMENT | 2 | 04/01/2011 |
| 703.38A | CONCRETE BOX CULVERT – CUTTING DETAILS | 2 | 10/01/2009 |
| 703.40H | CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (SQUARE) | 3 | 10/01/2011 |
| 703.41H | CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (SQUARE) | 3 | 10/01/2011 |
| 703.42H | CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE) | 3 | 10/01/2011 |
| 703.43H | CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE) | 3 | 10/01/2011 |
| 703.44H | CONCRETE DOUBLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE) | 3 | 10/01/2011 |
| 703.45C | CONCRETE DOUBLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE) | 3 | 10/01/2011 |
| 703.46 | CONCRETE DOUBLE BOX CULVERT – CUT SECTION | 1 | 10/01/2011 |
| 703.47 | CONCRETE DOUBLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT | 27 | 10/01/2011 |
| 703.60E | CONCRETE BOX STRUCTURE – PIPE INLET | 1 | 07/01/2001 |
| 703.80H | CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (SQUARE) | 3 | 12/01/2011 |
| 703.81H | CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (SQUARE) | 3 | 12/01/2011 |
| 703.82H | CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (LEFT ADVANCE) | 3 | 12/01/2011 |
| 703.83H | CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (LEFT ADVANCE) | 3 | 12/01/2011 |
| 703.84H | CONCRETE TRIPLE BOX CULVERT – STRAIGHT WINGS (RIGHT ADVANCE) | 3 | 12/01/2011 |
| 703.85C | CONCRETE TRIPLE BOX CULVERT – FLARED WINGS (RIGHT ADVANCE) | 3 | 12/01/2011 |
| 703.86 | CONCRETE TRIPLE BOX CULVERT – CUT SECTIONS | 1 | 12/01/2011 |
| 703.87 | CONCRETE TRIPLE BOX CULVERT – MEMBER SIZES AND REINFORCEMENT | 27 | 12/01/2011 |
| 706.35H | BAR SUPPORTS FOR CONCRETE REINFORCEMENT | 1 | 07/01/2004 |
| 712.40L | STEEL DAMS AT EXPANSION JOINTS | 1 | 10/01/2019 |
| 725.00C | CORRUGATED METAL PIPE INSTALLATION METHODS | 5 | 04/01/2011 |
| 725.31C | METAL CURTAIN WALL AND METAL INLETS | 1 | 07/01/2004 |
| 726.30J | RIGID CULVERT INSTALLATION METHODS | 2 | 04/01/2015 |
| 730.00E | THERMOPLASTIC PIPE INSTALLATION METHODS | 1 | 04/01/2015 |
| 731.00U | PRECAST MANHOLES | 2 | 07/01/2016 |
| 731.10S | PRECAST DROP INLET | 8 | 07/01/2016 |
| 732.00S | FLARED END SECTION | 3 | 04/01/2016 |
| 732.05C | BEVELED PIPE END TREATMENT | 2 | 07/01/2004 |
| 732.10H | SAFETY SLOPE END SECTION | 3 | 06/01/2013 |
| 733.00 | PRECAST CONCRETE BOX CULVERT TIES | 1 | 04/01/2018 |
| 806.10J | TEMPORARY EROSION CONTROL MEASURES | 6 | 04/01/2019 |
| 808.00 | TYPICAL PLANTING ILLUSTRATIONS | 3 | 07/01/2004 |
| 901.00AB | HIGHWAY LIGHTING – POLES, FOUNDATION & APPURTENANCES FOR 30’ M.H. | 4 | 04/01/2018 |
| 901.01AJ | HIGHWAY LIGHTING – POLES, FOUNDATION & APPURTENANCES FOR 45’ M.H. | 6 | 04/01/2018 |
| 901.02B | HIGHWAY LIGHTING – CABLE, CONDUIT AND TRENCHING | 1 | 04/01/2002 |

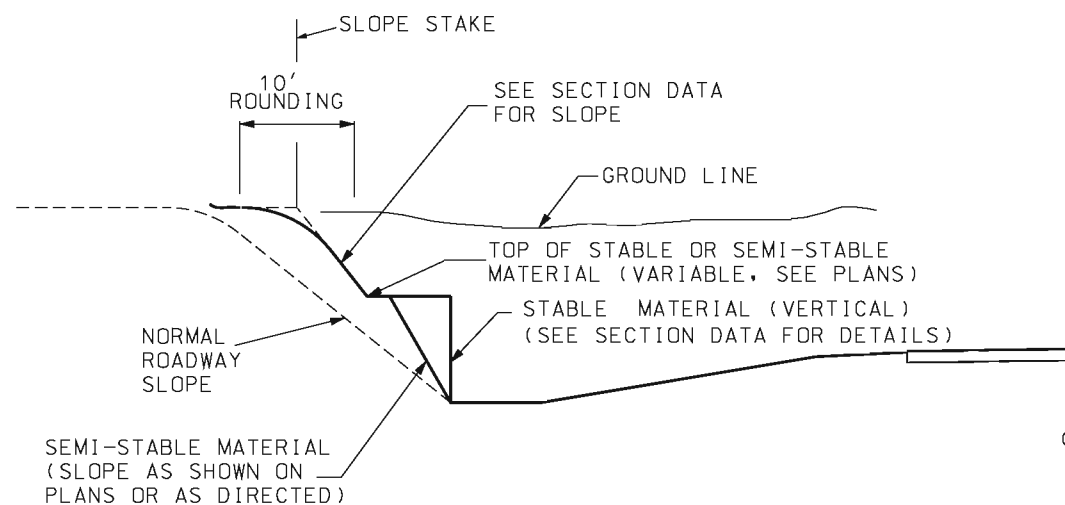
[illegible]



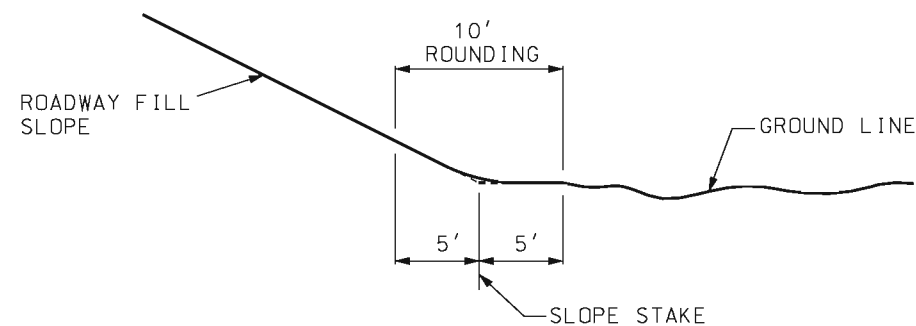
EXCAVATION PAY LIMITS



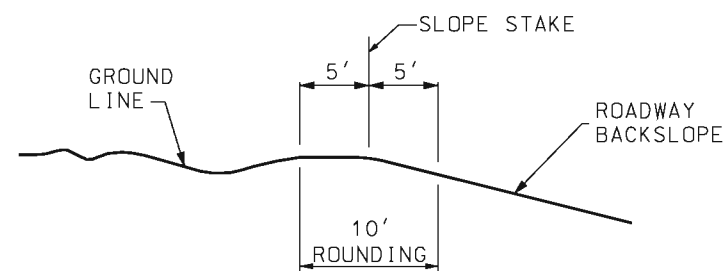
EMBANKMENT LIMITS



BACKSLOPES IN STABLE AND SEMI-STABLE MATERIAL

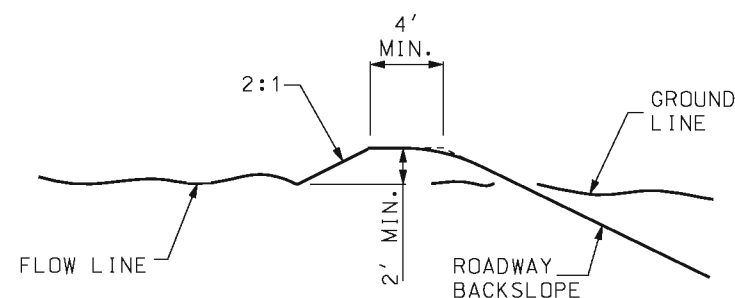


AT TOE OF ROADWAY FILL SLOPE



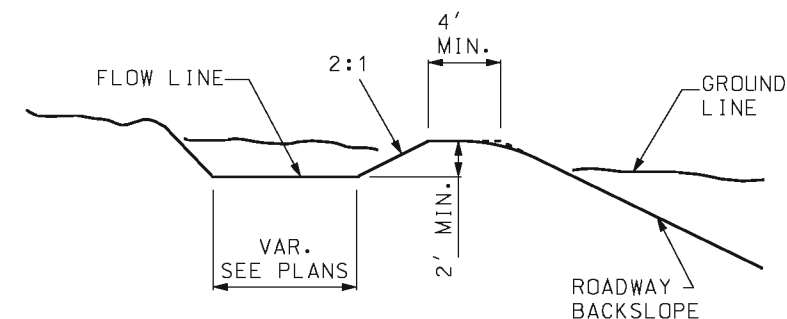
AT TOP OF ROADWAY BACKSLOPES

PARABOLIC ROUNDING



LEVEE

LEVEE AND/OR DITCH MAY BE LOCATED BACK OF BACKSLOPE WHEN CONDITIONS REQUIRE. USE DITCH ONLY WHERE INDICATED OR WHERE REQUIRED FOR DRAINAGE.


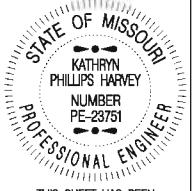


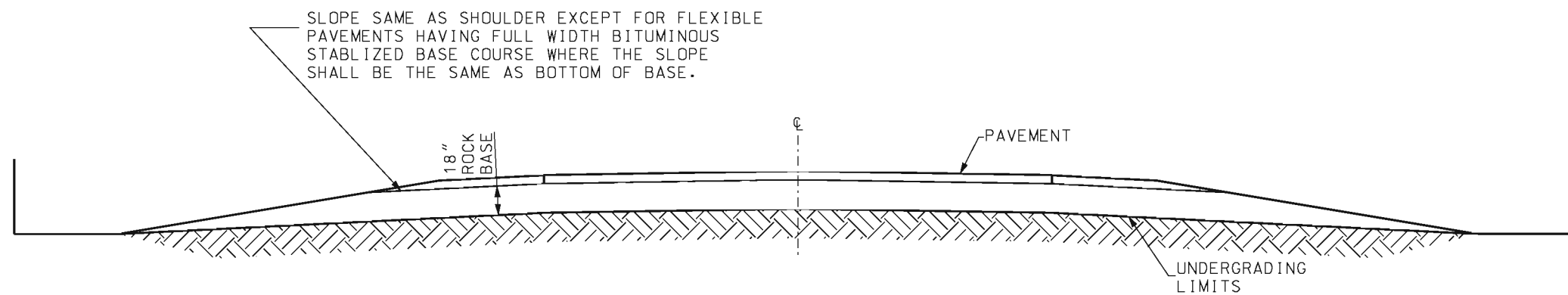
LEVEE AND DITCH

INTERCEPTION DITCH AND/OR LEVEE

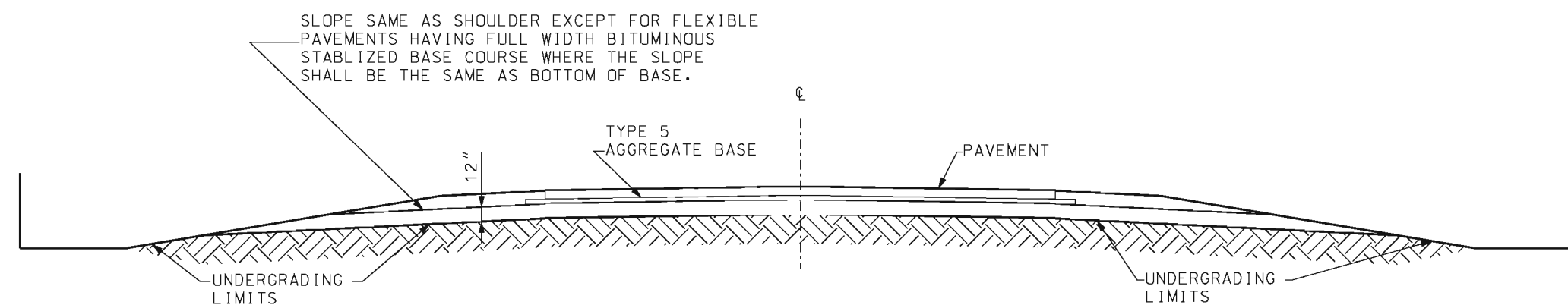
GENERAL NOTES:

SUBSURFACE LOGS OF MATERIALS OBTAINED DURING THE SOIL SURVEY FOR THE PURPOSE OF CUT CLASSIFICATION MAY BE ACQUIRED FROM THE DISTRICT OFFICE UPON REQUEST.

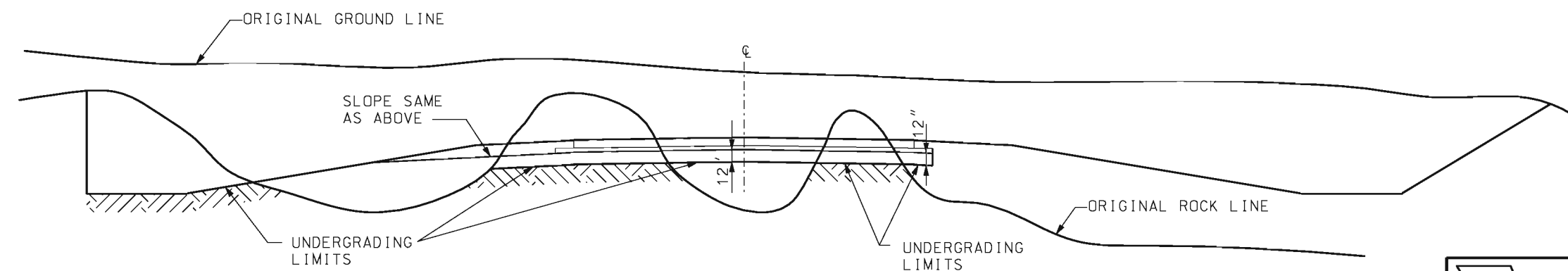
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | EXCAVATION AND EMBANKMENT TYPICAL DETAILS |
| DATE EFFECTIVE: 08/01/1998 DATE PREPARED: 8/21/2009 | 203.00E |
| SHEET NO. 1 OF 1 | |





IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH 18" ROCK BASE



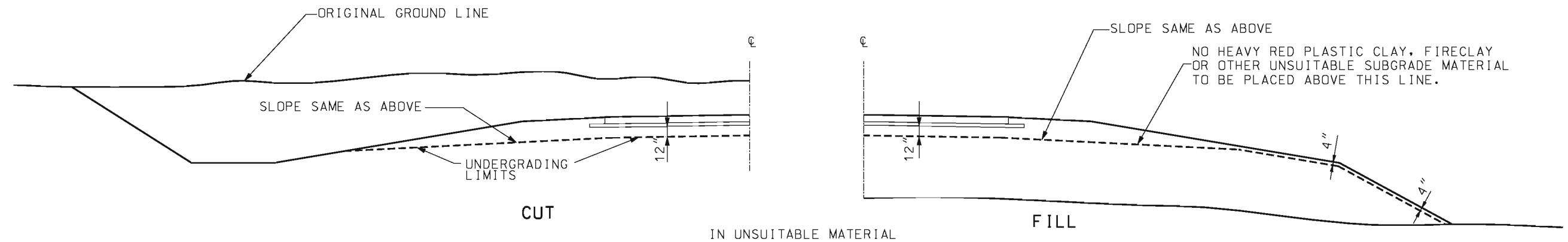
IN ROCK OVER ENTIRE WIDTH OF ROADBED WITH TYPE 5 AGGREGATE BASE



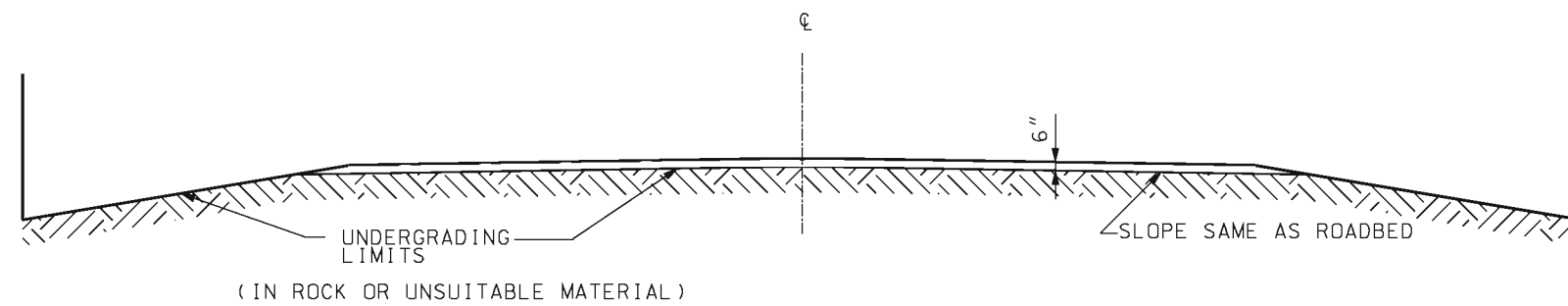
IN ROCK OVER PARTIAL WIDTH OF ROADBED

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | <p align="center">UNDERGRADING TYPICAL DETAILS</p> |
| DATE EFFECTIVE: 01/01/2004 DATE PREPARED: 8/21/2009 | <p align="center">203.02F</p> |
| SHEET NO. 1 OF 2 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.


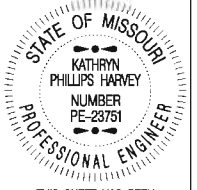


UNDERGRADING LIMITS (FLEXIBLE OR RIGID PAVEMENTS)



UNDERGRADING LIMITS (EARTH OR AGGREGATE TYPE SURFACE)

GENERAL NOTES:

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <h2>UNDERGRADING</h2> <h3>TYPICAL DETAILS</h3> |
| DATE EFFECTIVE: 01/01/2004 DATE PREPARED: 8/21/2009 | 203.02F |
| SHEET NO. 2 OF 2 | |

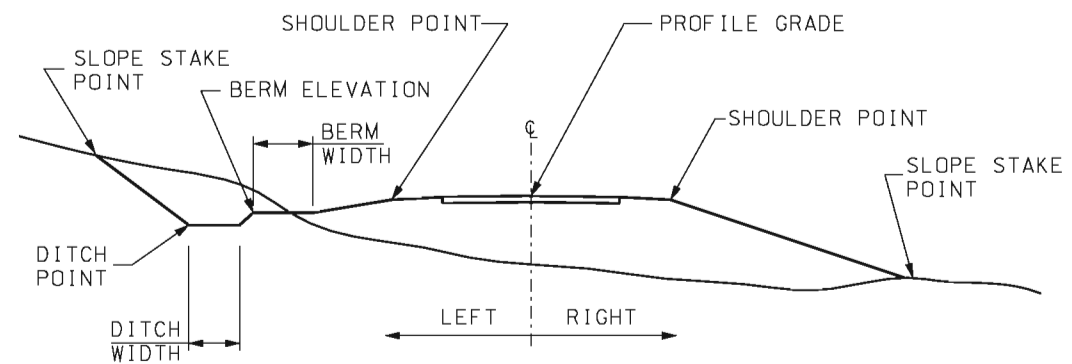


FIGURE A

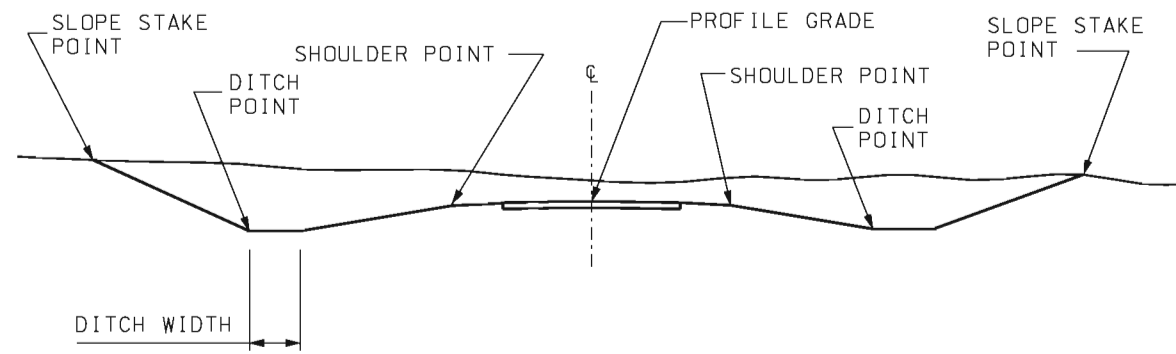


FIGURE B

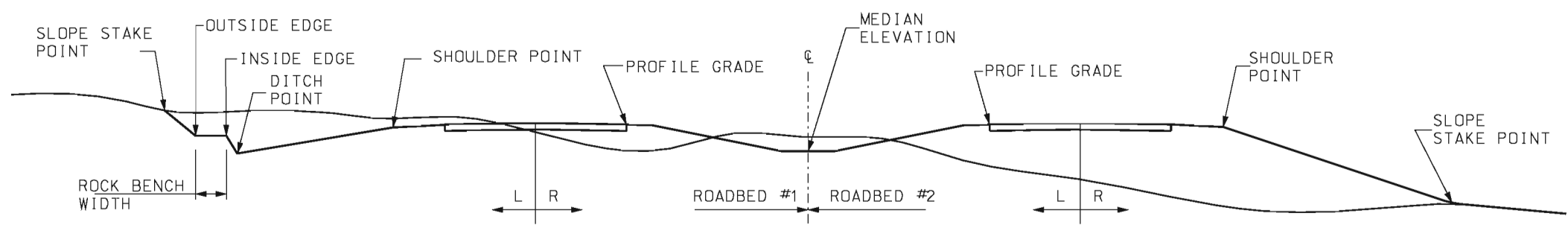


FIGURE C

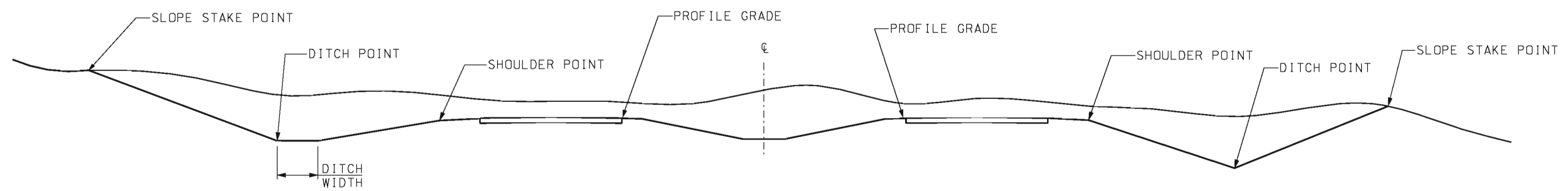


FIGURE D

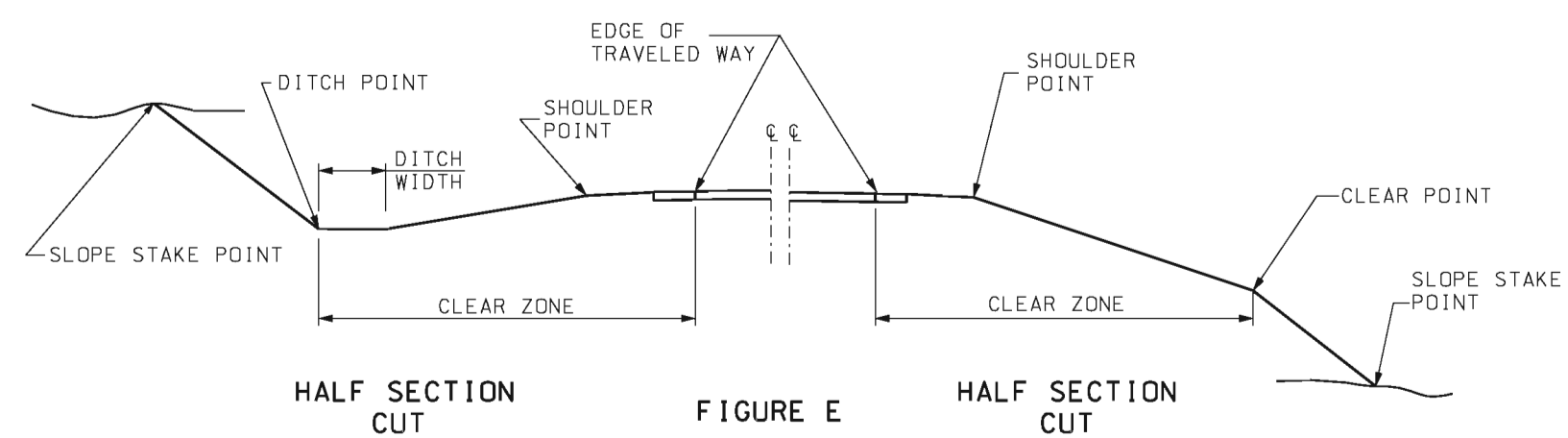


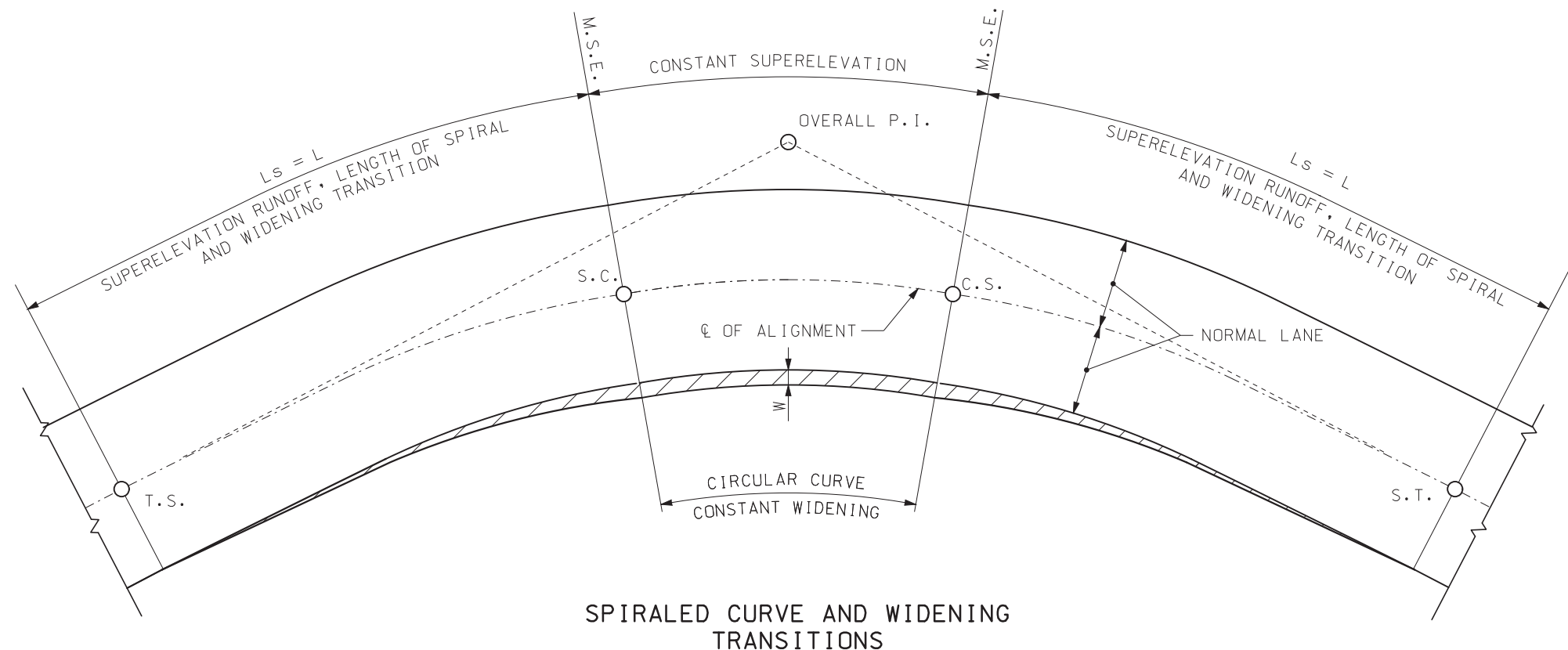


FIGURE E

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TABULATED EARTHWORK AND SECTION DATA |
| DATE EFFECTIVE: 02/01/2009 DATE PREPARED: 12/18/2008 | 203.10D |
| SHEET NO. 1 OF 1 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



MULTILANE FACTORS
FOR "L"

| | | | |
|-----|------|--------------------------|--------|
| 1.0 | LANE | ROTATED (2 LANE ROADBED) | = 1.00 |
| 1.5 | LANE | ROTATED (3 LANE ROADBED) | = 1.25 |
| 2.0 | LANE | ROTATED (4 LANE ROADBED) | = 1.50 |
| 2.5 | LANE | ROTATED (5 LANE ROADBED) | = 1.75 |
| 3.0 | LANE | ROTATED (6 LANE ROADBED) | = 2.00 |
| 3.5 | LANE | ROTATED (7 LANE ROADBED) | = 2.25 |

MAXIMUM RADIUS FOR USE OF A
SPIRAL CURVE TRANSITION

| DESIGN SPEED | MAXIMUM RADIUS (FT) |
|--------------|---------------------|
| 30 | 456 |
| 35 | 620 |
| 40 | 810 |
| 45 | 1025 |
| 50 | 1265 |
| 55 | 1531 |
| 60 | 1822 |
| 65 | 2138 |
| 70 | 2479 |

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.

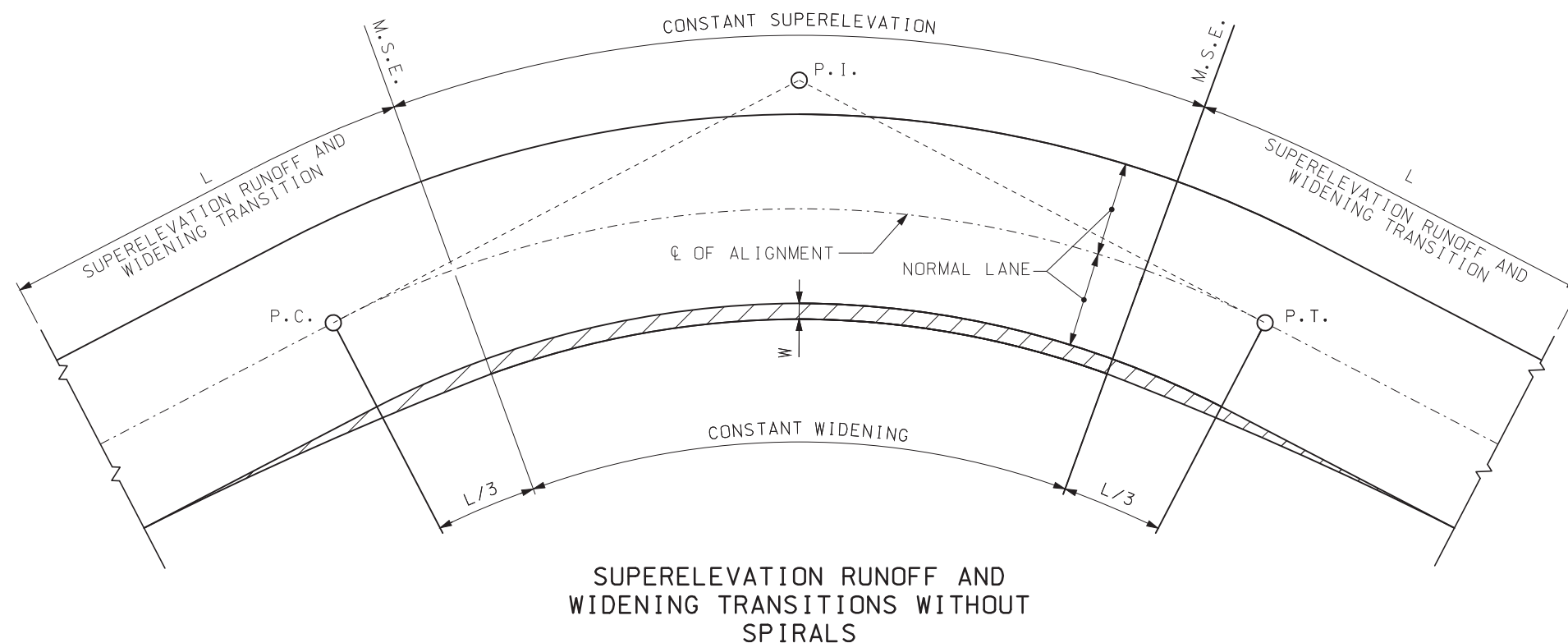
GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDERS, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



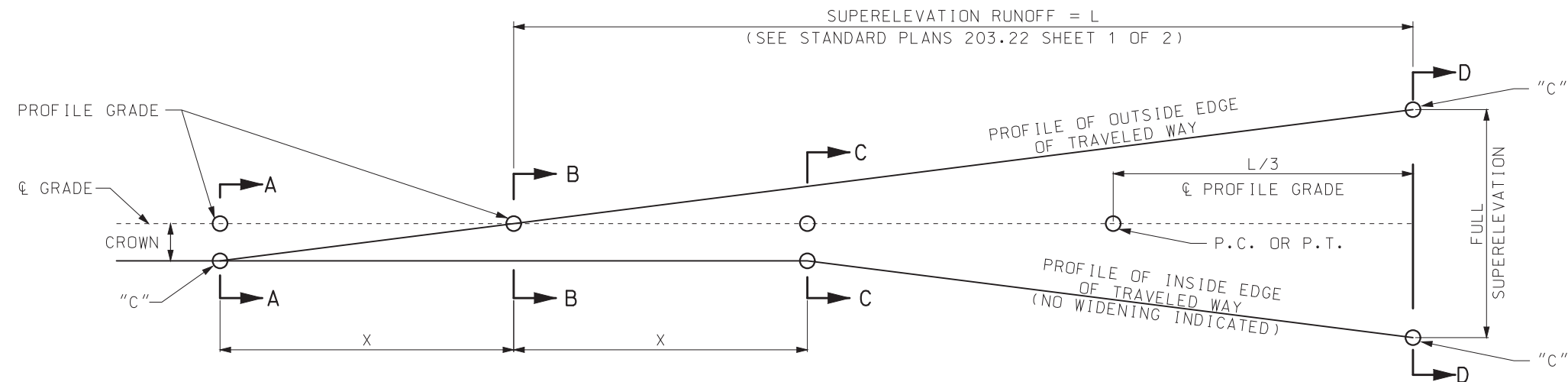
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

**SUPERELEVATION
SPIRALS AND WIDENING
UNDIVIDED HIGHWAYS**

DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

203.20G

SHEET NO.
1 OF 4

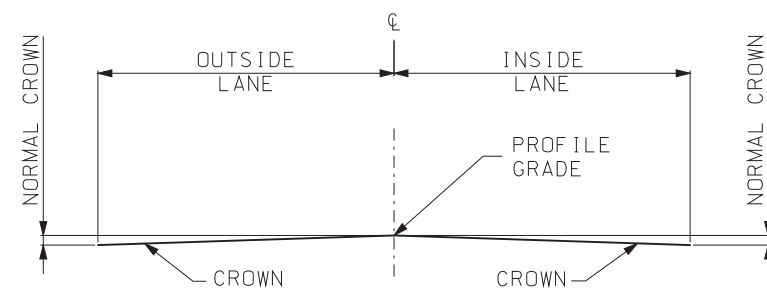


A-A TO B-B IS THE TANGENT RUNOUT.

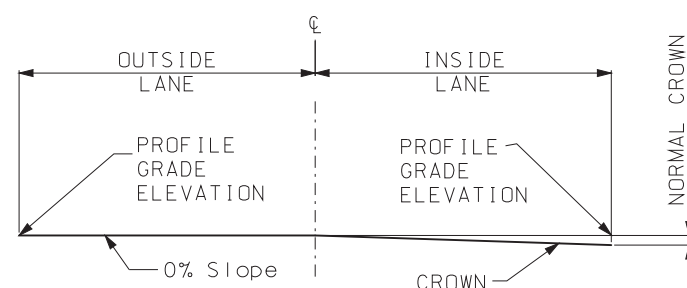
$$X = \frac{L \times NC(\%)}{e(\%)}$$

NOTE:

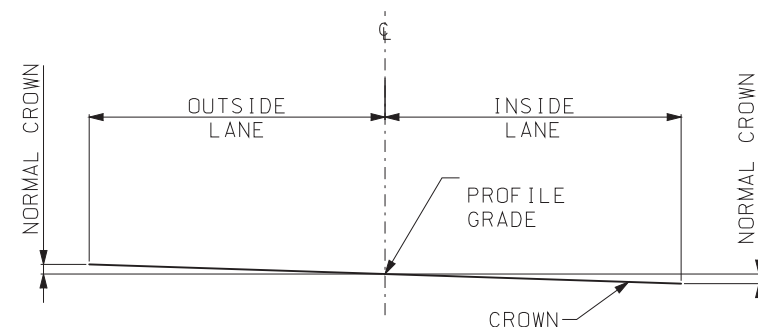
SHORT VERTICAL CURVES MAY BE INSERTED AT POINTS "C" BY EYE ADJUSTMENTS OF STAKES OR FORMS IN THE FIELD.



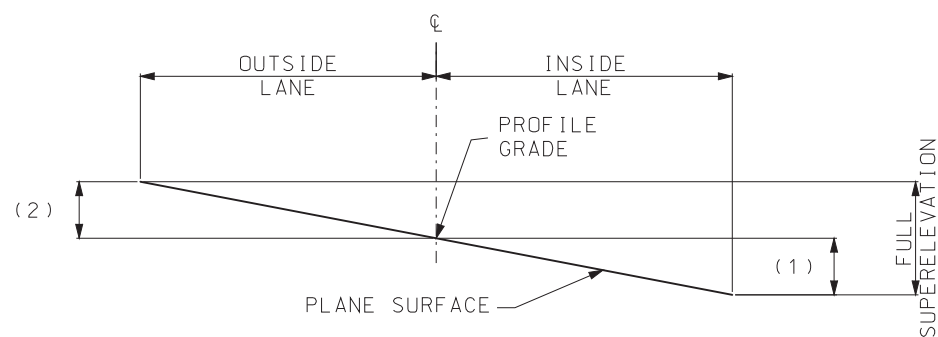
SECTION A-A



SECTION B-B



SECTION C-C




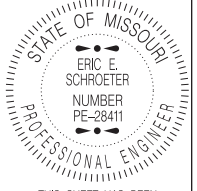
(1) FULL S.E. FOR $\frac{1}{2}$ PAVEMENT WIDTH IF GREATER THAN CROWN SLOPE.

(2) FULL S.E. FOR $\frac{1}{2}$ PAVEMENT WIDTH.

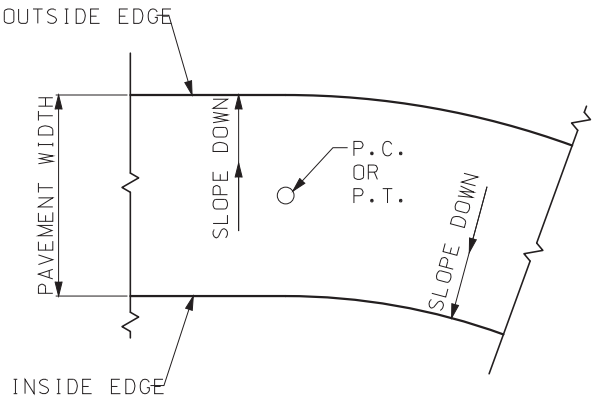
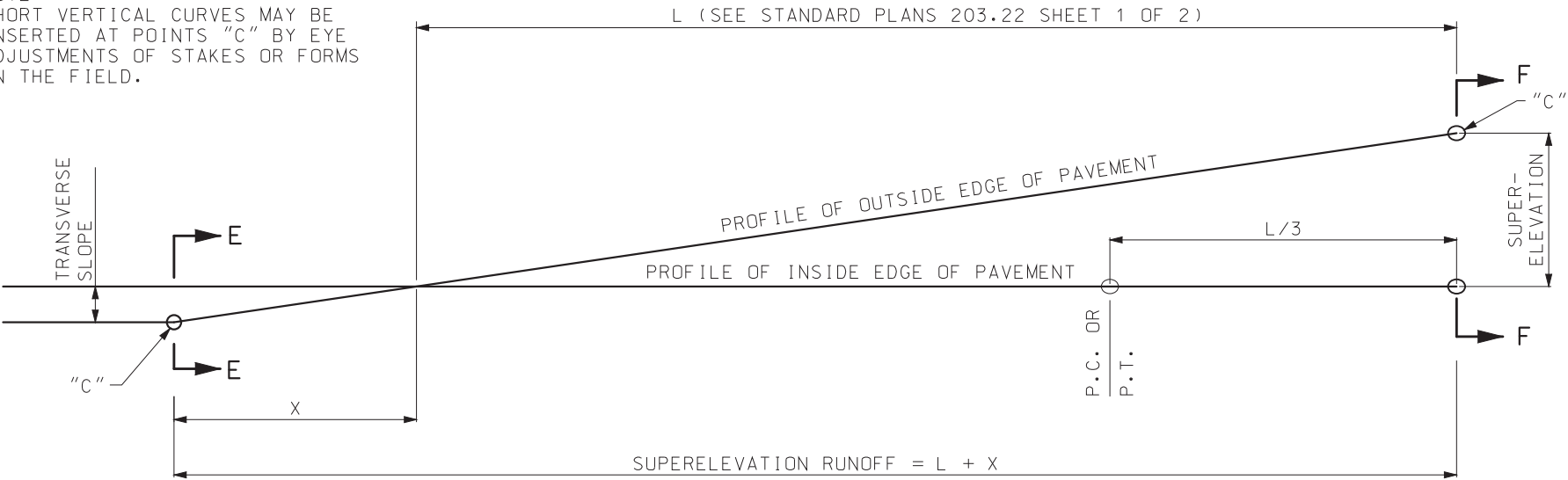
SECTION D-D

CASE NUMBER 1

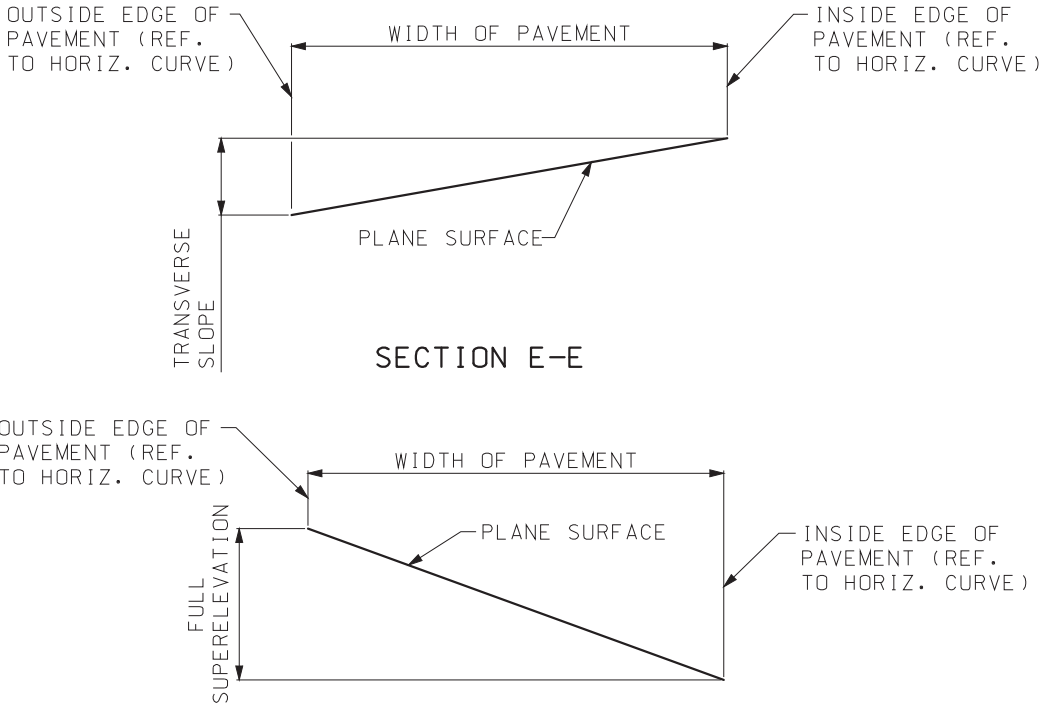
(WHERE HIGH POINT OF TRAVELED WAY IS AT CENTERLINE ON TANGENT SECTION)
NOTE: USE FOR 2 LANE TRAFFIC ROADS ONLY. PAVEMENT REVOLVED ABOUT ITS CL.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 203.20G |
| SHEET NO. 2 OF 4 | |

NOTE:
SHORT VERTICAL CURVES MAY BE
INSERTED AT POINTS "C" BY EYE
ADJUSTMENTS OF STAKES OR FORMS
IN THE FIELD.



PLAN OF ALIGNMENT
FOR CASE NUMBER 2




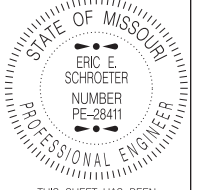
SECTION E-E

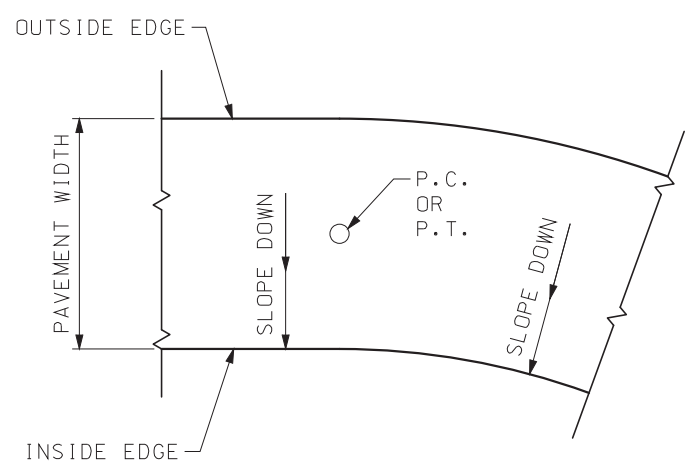
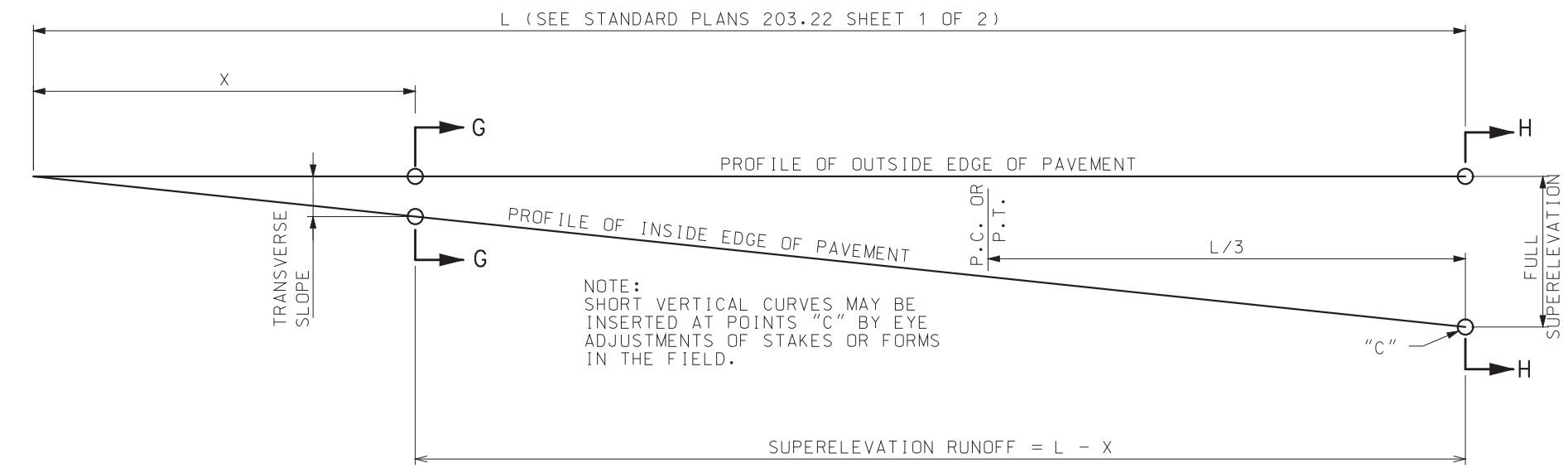
SECTION F-F

CASE NUMBER 2

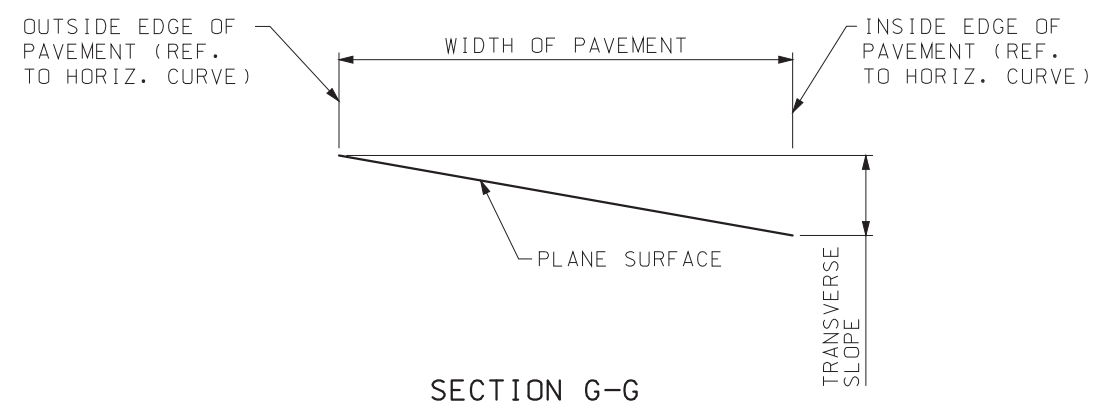
(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS OPPOSITE TO SLOPE OF SUPERELEVATION)
NOTE: PAVEMENT REVOLVED ABOUT ITS INSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

STRAIGHT LINE METHODS OF ATTAINING SUPERELEVATION

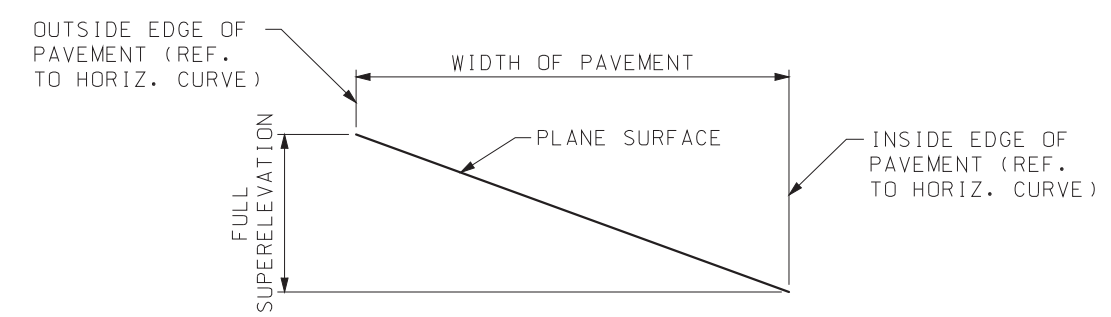
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 203.20G |
| SHEET NO. 3 OF 4 | |



PLAN OF ALIGNMENT
FOR CASE NUMBER 3



SECTION G-G


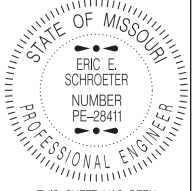


SECTION H-H

CASE NUMBER 3

(WHERE TRANSVERSE SLOPE ON TANGENT SECTION IS SAME DIRECTION AS SLOPE OF SUPERELEVATION)
NOTE: PAVEMENT REVOLVED ABOUT ITS OUTSIDE EDGE WITH REFERENCE TO THE HORIZONTAL CURVE WHICH IS BEING APPROACHED.

STRAIGHT LINE METHOD OF ATTAINING SUPERELEVATION

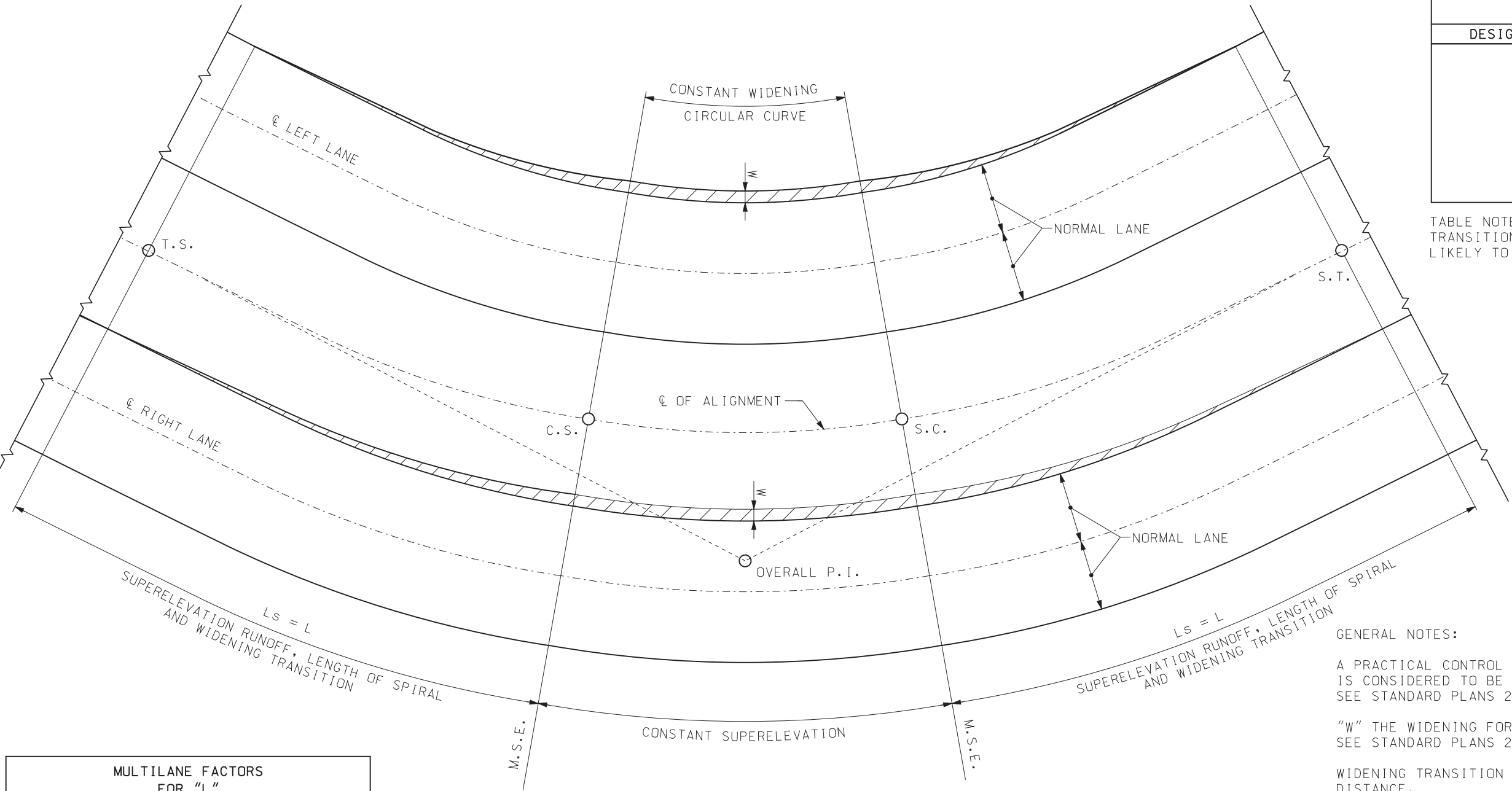
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | <p align="center">SUPERELEVATION SPIRALS AND WIDENING UNDIVIDED HIGHWAYS</p> |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 203.20G |
| SHEET NO. 4 OF 4 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION | |
|---|---------------------|
| DESIGN SPEED | MAXIMUM RADIUS (FT) |
| 30 | 456 |
| 35 | 620 |
| 40 | 810 |
| 45 | 1025 |
| 50 | 1265 |
| 55 | 1531 |
| 60 | 1822 |
| 65 | 2138 |
| 70 | 2479 |

TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.



GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.

"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

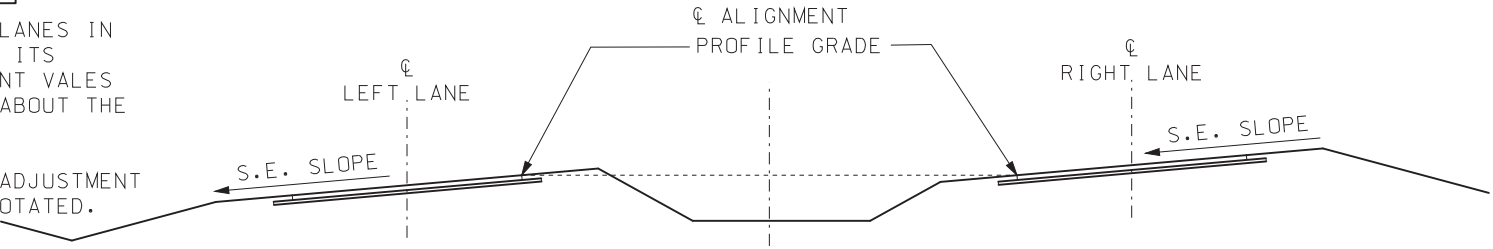
SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.

| MULTILANE FACTORS FOR "L" |
|--|
| 1.0 LANE ROTATED (2 LANE ROADBED) = 1.00 |
| 1.5 LANE ROTATED (3 LANE ROADBED) = 1.25 |
| 2.0 LANE ROTATED (4 LANE ROADBED) = 1.50 |
| 2.5 LANE ROTATED (5 LANE ROADBED) = 1.75 |
| 3.0 LANE ROTATED (6 LANE ROADBED) = 2.00 |
| 3.5 LANE ROTATED (7 LANE ROADBED) = 2.25 |


EXAMPLE: A SIX LANE DIVIDED HIGHWAY (3 LANES IN EACH DIRECTION) ROTATED SEPARATELY ABOUT ITS MEDIAN EDGES WOULD USE THE SAME ADJUSTMENT VALES AS A SIX LANE UNDIVIDED HIGHWAY ROTATED ABOUT THE CENTERLINE.

BOTH CASES WOULD USE THE 3 LANE ROTATED ADJUSTMENT VALUE OF 2 TIMES THE VALUE OF ONE LANE ROTATED.

SPIRALED CURVE AND WIDENING TRANSITIONS

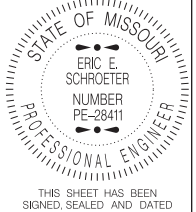


SECTION ON SUPERELEVATED CURVE
CURVE TO LEFT (ILLUSTRATED)



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

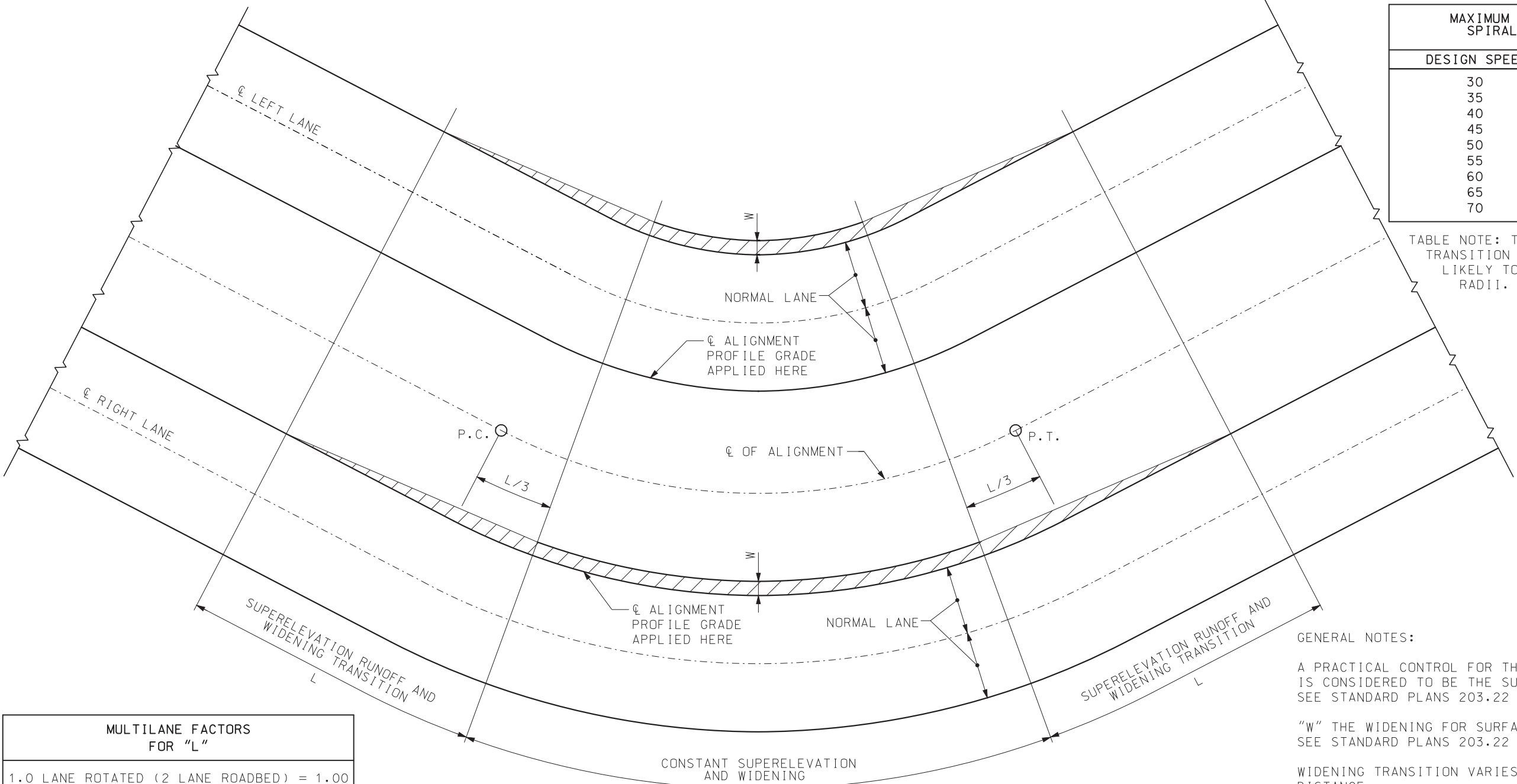


STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

**SUPERELEVATION,
SPIRALS AND WIDENING
DIVIDED HIGHWAYS**

| | | |
|----------------------------|---------|---------------------|
| DATE EFFECTIVE: 07/01/2017 | 203.21K | SHEET NO. 1 OF 3 |
| DATE PREPARED: 5/1/2017 | | |



| MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION | |
|---|---------------------|
| DESIGN SPEED | MAXIMUM RADIUS (FT) |
| 30 | 456 |
| 35 | 620 |
| 40 | 810 |
| 45 | 1025 |
| 50 | 1265 |
| 55 | 1531 |
| 60 | 1822 |
| 65 | 2138 |
| 70 | 2479 |

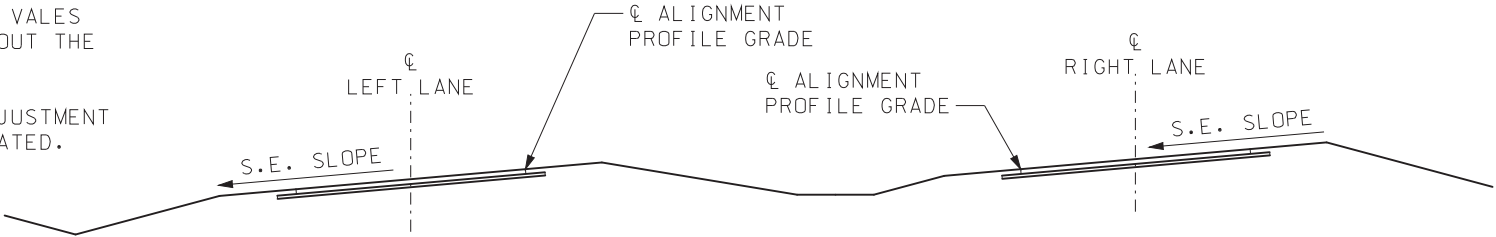
TABLE NOTE: THE EFFECT OF SPIRAL CURVE TRANSITION ON LATERAL ACCELERATION IS LIKELY TO BE NEGLIGIBLE FOR LARGER RADII.

| MULTILANE FACTORS FOR "L" |
|--|
| 1.0 LANE ROTATED (2 LANE ROADBED) = 1.00 |
| 1.5 LANE ROTATED (3 LANE ROADBED) = 1.25 |
| 2.0 LANE ROTATED (4 LANE ROADBED) = 1.50 |
| 2.5 LANE ROTATED (5 LANE ROADBED) = 1.75 |
| 3.0 LANE ROTATED (6 LANE ROADBED) = 2.00 |
| 3.5 LANE ROTATED (7 LANE ROADBED) = 2.25 |

EXAMPLE: A SIX LANE DIVIDED HIGHWAY (3 LANES IN EACH DIRECTION) ROTATED SEPARATELY ABOUT ITS MEDIAN EDGES WOULD USE THE SAME ADJUSTMENT VALES AS A SIX LANE UNDIVIDED HIGHWAY ROTATED ABOUT THE CENTERLINE.

BOTH CASES WOULD USE THE 3 LANE ROTATED ADJUSTMENT VALUE OF 2 TIMES THE VALUE OF ONE LANE ROTATED.

SUPERELEVATION RUNOUT WITHOUT SPIRALS



SECTION ON SUPERELEVATED CURVE
CURVE TO LEFT (ILLUSTRATED)


GENERAL NOTES:

A PRACTICAL CONTROL FOR THE LENGTH OF SPIRAL "Ls" IS CONSIDERED TO BE THE SUPERELEVATION RUNOFF "L", SEE STANDARD PLANS 203.22 SHEET 1 OF 2.


"W" THE WIDENING FOR SURFACING AT INSIDE SHOULDER, SEE STANDARD PLANS 203.22 SHEET 2 OF 2.

WIDENING TRANSITION VARIES IN DIRECT PROPORTION TO DISTANCE.

SPIRAL CURVES ARE USED ON ALL ROADWAYS THAT HAVE DESIGN TRAFFIC GREATER THAN 400 VEHICLES PER DAY, AND HAVE A RADIUS LESS THAN THE VALUES LISTED IN THE "MAXIMUM RADIUS FOR USE OF A SPIRAL CURVE TRANSITION" TABLE.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

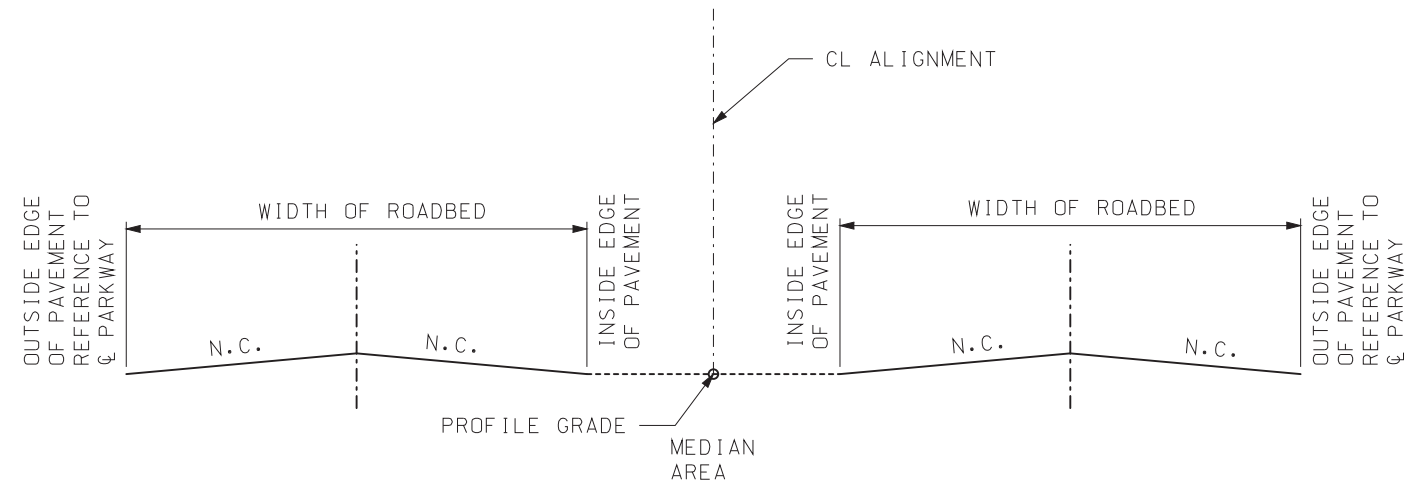


**SUPERELEVATION,
SPIRALS AND WIDENING
DIVIDED HIGHWAYS**

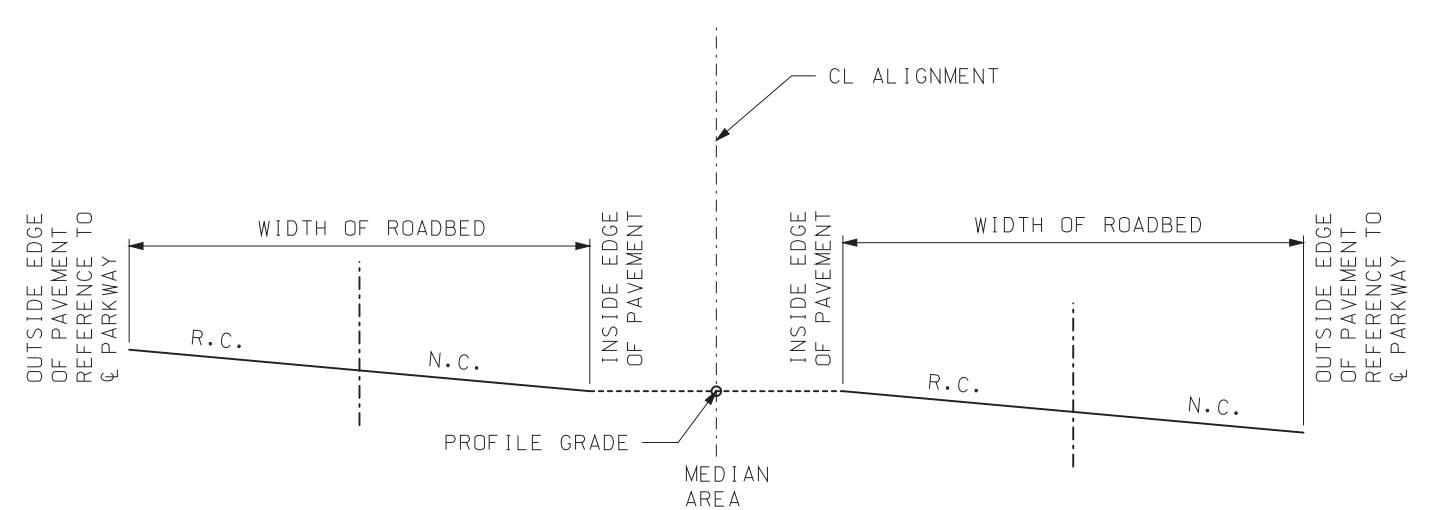
| | |
|-----------------|------------|
| DATE EFFECTIVE: | 07/01/2017 |
| DATE PREPARED: | 5/1/2017 |

| | |
|---------|---------------------|
| 203.21K | SHEET NO. 2 OF 3 |
|---------|---------------------|

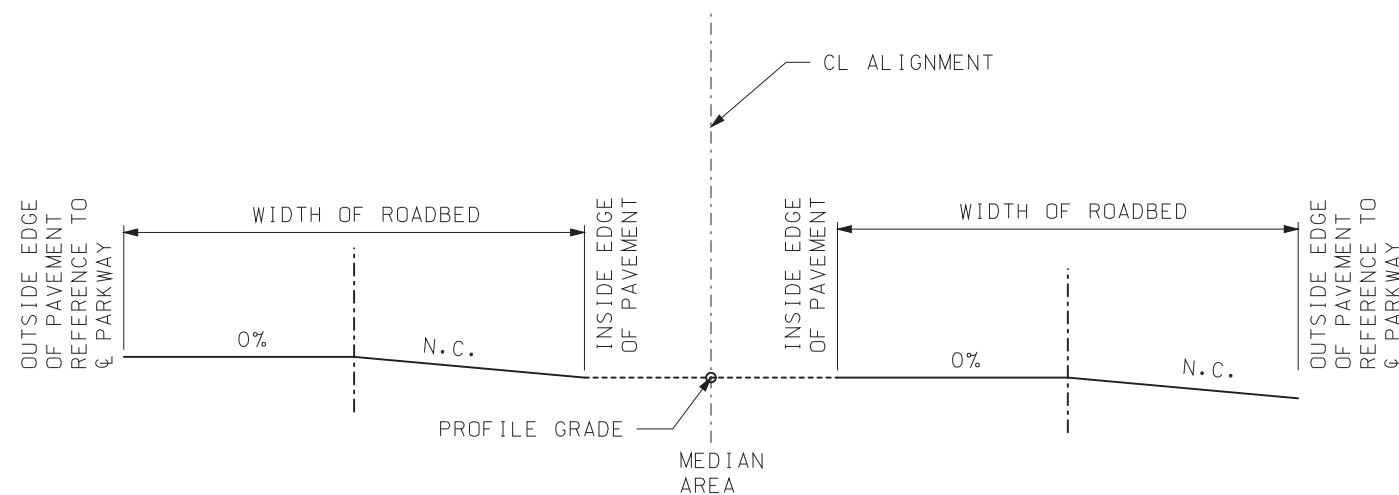
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



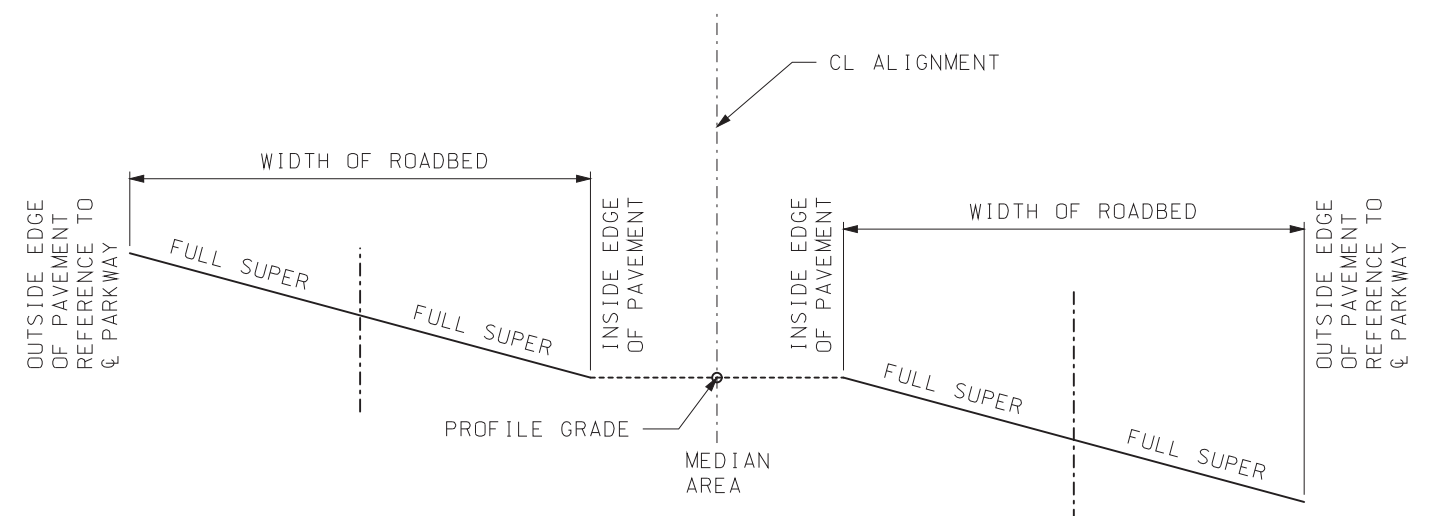
SECTION A-A



SECTION C-C
(CURVE TO RIGHT)



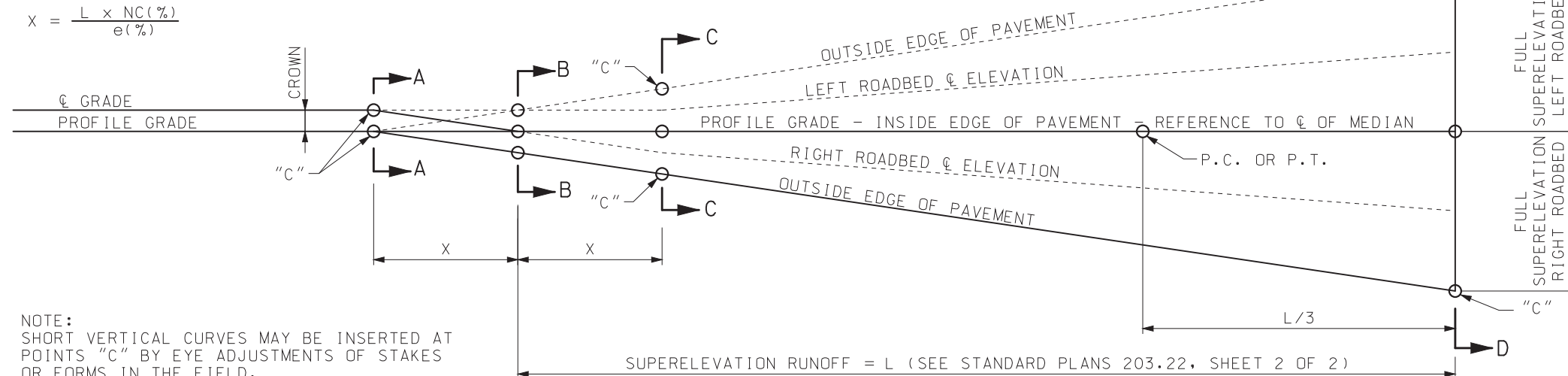
SECTION B-B
(CURVE TO RIGHT)




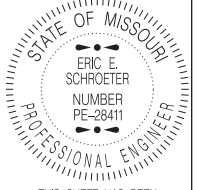
SECTION D-D
(CURVE TO RIGHT)

A-A TO B-B (E-E TO F-F) IS THE TANGENT RUNOUT.

$$x = \frac{L \times NC(\%)}{e(\%)}$$



NOTE:
SHORT VERTICAL CURVES MAY BE INSERTED AT
POINTS "C" BY EYE ADJUSTMENTS OF STAKES
OR FORMS IN THE FIELD.

| | | |
|--|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | SUPERELEVATION, SPIRALS AND WIDENING DIVIDED HIGHWAYS | |
| | DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 203.21K |

| MINIMUM RADII FOR DESIGN SUPERELEVATION RATES, DESIGN SPEEDS, AND $e_{\max} = 4\%$ | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------|----|-----|--------|----|-----|--------|----|-----|--------|----|-----|--------|----|-----|--------|-----|-----|--------|-----|-----|--|
| e% | DESIGN SPEED (MPH) | | | | | | | | | | | | | | | | | | | | | |
| | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | | | 60 | | | |
| | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | |
| NC | 2,830 | 0 | 0 | 3,730 | 0 | 0 | 4,770 | 0 | 0 | 5,930 | 0 | 0 | 7,220 | 0 | 0 | 8,650 | 0 | 0 | 10,300 | 0 | 0 | |
| RC | 1,880 | 36 | 55 | 2,490 | 39 | 58 | 3,220 | 41 | 62 | 4,040 | 44 | 67 | 4,940 | 48 | 72 | 5,950 | 51 | 77 | 7,080 | 53 | 80 | |
| 2.2 | 1,580 | 40 | 60 | 2,120 | 43 | 64 | 2,760 | 46 | 58 | 3,480 | 49 | 73 | 4,280 | 53 | 79 | 5,180 | 56 | 84 | 6,190 | 59 | 88 | |
| 2.4 | 1,270 | 44 | 65 | 1,760 | 46 | 70 | 2,340 | 50 | 74 | 2,980 | 53 | 80 | 3,690 | 58 | 86 | 4,500 | 61 | 92 | 5,410 | 64 | 96 | |
| 2.6 | 1,000 | 47 | 71 | 1,420 | 50 | 75 | 1,930 | 54 | 81 | 2,490 | 58 | 87 | 3,130 | 62 | 94 | 3,870 | 66 | 100 | 4,700 | 69 | 104 | |
| 2.8 | 817 | 51 | 76 | 1,170 | 54 | 81 | 1,620 | 58 | 87 | 2,100 | 62 | 93 | 2,660 | 67 | 101 | 3,310 | 71 | 107 | 4,060 | 75 | 112 | |
| 3.0 | 681 | 55 | 82 | 982 | 58 | 87 | 1,370 | 62 | 93 | 1,800 | 67 | 100 | 2,290 | 72 | 108 | 2,860 | 77 | 115 | 3,530 | 80 | 120 | |
| 3.2 | 576 | 58 | 87 | 835 | 62 | 93 | 1,180 | 66 | 99 | 1,550 | 71 | 107 | 1,980 | 77 | 115 | 2,490 | 82 | 123 | 3,090 | 85 | 128 | |
| 3.4 | 490 | 62 | 93 | 714 | 66 | 99 | 1,010 | 70 | 106 | 1,340 | 76 | 113 | 1,720 | 82 | 122 | 2,170 | 87 | 130 | 2,700 | 91 | 136 | |
| 3.6 | 416 | 65 | 98 | 610 | 70 | 105 | 865 | 74 | 112 | 1,150 | 80 | 120 | 1,480 | 86 | 130 | 1,880 | 92 | 138 | 2,350 | 96 | 144 | |
| 3.8 | 348 | 69 | 104 | 512 | 74 | 110 | 730 | 79 | 118 | 970 | 84 | 127 | 1,260 | 91 | 137 | 1,600 | 97 | 146 | 2,010 | 101 | 152 | |
| 4.0 | 250 | 73 | 109 | 371 | 77 | 116 | 533 | 83 | 124 | 711 | 89 | 133 | 926 | 96 | 144 | 1,190 | 102 | 153 | 1,500 | 107 | 160 | |

| MINIMUM RADII FOR DESIGN SUPERELEVATION RATES, DESIGN SPEEDS, AND $e_{\max} = 8\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|
| e% | DESIGN SPEED (MPH) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 30 | | | 35 | | | 40 | | | 45 | | | 50 | | | 55 | | | 60 | | | 65 | | | 70 | | |
| | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 | RADIUS | L1 | L2 |
| NC | 3,240 | 0 | 0 | 4,260 | 0 | 0 | 5,410 | 0 | 0 | 6,710 | 0 | 0 | 8,150 | 0 | 0 | 9,720 | 0 | 0 | 11,500 | 0 | 0 | 12,900 | 0 | 0 | 14,500 | 0 | 0 |
| RC | 2,370 | 36 | 55 | 3,120 | 39 | 58 | 3,970 | 41 | 62 | 4,930 | 44 | 67 | 5,990 | 48 | 72 | 7,150 | 51 | 77 | 8,440 | 53 | 80 | 9,510 | 56 | 84 | 10,700 | 60 | 90 |
| 2.2 | 2,130 | 40 | 60 | 2,800 | 43 | 64 | 3,570 | 46 | 58 | 4,440 | 49 | 73 | 5,400 | 53 | 79 | 6,450 | 56 | 84 | 7,620 | 59 | 88 | 8,600 | 61 | 92 | 9,660 | 66 | 99 |
| 2.4 | 1,930 | 44 | 65 | 2,540 | 46 | 70 | 3,240 | 50 | 74 | 4,030 | 53 | 80 | 4,910 | 58 | 86 | 5,870 | 61 | 92 | 6,930 | 64 | 96 | 7,830 | 67 | 100 | 8,810 | 72 | 108 |
| 2.6 | 1,760 | 47 | 71 | 2,320 | 50 | 75 | 2,960 | 54 | 81 | 3,690 | 58 | 87 | 4,490 | 62 | 94 | 5,370 | 66 | 100 | 6,350 | 69 | 104 | 7,180 | 73 | 109 | 8,090 | 78 | 117 |
| 2.8 | 1,610 | 51 | 76 | 2,130 | 54 | 81 | 2,720 | 58 | 87 | 3,390 | 62 | 93 | 4,130 | 67 | 101 | 4,950 | 71 | 107 | 5,850 | 75 | 112 | 6,630 | 78 | 117 | 7,470 | 84 | 126 |
| 3.0 | 1,480 | 55 | 82 | 1,960 | 58 | 87 | 2,510 | 62 | 93 | 3,130 | 67 | 100 | 3,820 | 72 | 108 | 4,580 | 77 | 115 | 5,420 | 80 | 120 | 6,140 | 84 | 126 | 6,930 | 90 | 135 |
| 3.2 | 1,370 | 58 | 87 | 1,820 | 62 | 93 | 2,330 | 66 | 99 | 2,900 | 71 | 107 | 3,550 | 77 | 115 | 4,250 | 82 | 123 | 5,040 | 85 | 128 | 5,720 | 89 | 134 | 6,460 | 96 | 144 |
| 3.4 | 1,270 | 62 | 93 | 1,690 | 66 | 99 | 2,170 | 70 | 106 | 2,700 | 76 | 113 | 3,300 | 82 | 122 | 3,970 | 87 | 130 | 4,700 | 91 | 136 | 5,350 | 95 | 142 | 6,050 | 102 | 153 |
| 3.6 | 1,180 | 65 | 98 | 1,570 | 70 | 105 | 2,020 | 74 | 112 | 2,520 | 80 | 120 | 3,090 | 86 | 130 | 3,710 | 92 | 138 | 4,400 | 96 | 144 | 5,010 | 100 | 151 | 5,680 | 108 | 162 |
| 3.8 | 1,100 | 69 | 104 | 1,470 | 74 | 110 | 1,890 | 79 | 118 | 2,360 | 84 | 127 | 2,890 | 91 | 137 | 3,480 | 97 | 146 | 4,140 | 101 | 152 | 4,700 | 106 | 159 | 5,350 | 114 | 171 |
| 4.0 | 1,030 | 73 | 109 | 1,370 | 77 | 116 | 1,770 | 83 | 124 | 2,220 | 89 | 133 | 2,720 | 96 | 144 | 3,270 | 102 | 153 | 3,890 | 107 | 160 | 4,450 | 112 | 167 | 5,050 | 120 | 180 |
| 4.2 | 955 | 76 | 115 | 1,280 | 81 | 122 | 1,660 | 87 | 130 | 2,080 | 93 | 140 | 2,560 | 101 | 151 | 3,080 | 107 | 161 | 3,670 | 112 | 168 | 4,200 | 117 | 176 | 4,780 | 126 | 189 |
| 4.4 | 893 | 80 | 120 | 1,200 | 85 | 128 | 1,560 | 91 | 137 | 1,960 | 98 | 147 | 2,410 | 106 | 158 | 2,910 | 112 | 169 | 3,470 | 117 | 176 | 3,980 | 123 | 184 | 4,540 | 132 | 198 |
| 4.6 | 834 | 84 | 125 | 1,130 | 89 | 134 | 1,470 | 95 | 143 | 1,850 | 102 | 153 | 2,280 | 110 | 166 | 2,750 | 117 | 176 | 3,290 | 123 | 184 | 3,770 | 128 | 193 | 4,310 | 138 | 207 |
| 4.8 | 779 | 87 | 131 | 1,060 | 93 | 139 | 1,390 | 99 | 149 | 1,750 | 107 | 160 | 2,160 | 115 | 173 | 2,610 | 123 | 184 | 3,120 | 128 | 192 | 3,590 | 134 | 201 | 4,100 | 144 | 216 |
| 5.0 | 727 | 91 | 136 | 991 | 97 | 145 | 1,310 | 103 | 155 | 1,650 | 111 | 167 | 2,040 | 120 | 180 | 2,470 | 128 | 191 | 2,960 | 133 | 200 | 3,410 | 140 | 209 | 3,910 | 150 | 225 |
| 5.2 | 676 | 95 | 142 | 929 | 101 | 151 | 1,230 | 108 | 161 | 1,560 | 116 | 173 | 1,930 | 125 | 187 | 2,350 | 133 | 199 | 2,820 | 138 | 208 | 3,250 | 145 | 218 | 3,740 | 156 | 234 |
| 5.4 | 627 | 98 | 147 | 870 | 105 | 157 | 1,160 | 112 | 168 | 1,480 | 120 | 180 | 1,830 | 130 | 194 | 2,230 | 138 | 207 | 2,680 | 144 | 216 | 3,110 | 151 | 226 | 3,570 | 162 | 243 |
| 5.6 | 582 | 102 | 153 | 813 | 108 | 163 | 1,090 | 116 | 174 | 1,390 | 124 | 187 | 1,740 | 134 | 202 | 2,120 | 143 | 214 | 2,550 | 149 | 224 | 2,970 | 156 | 234 | 3,420 | 168 | 252 |
| 5.8 | 542 | 105 | 158 | 761 | 112 | 168 | 1,030 | 120 | 180 | 1,320 | 129 | 193 | 1,650 | 139 | 209 | 2,010 | 148 | 222 | 2,430 | 155 | 232 | 2,840 | 162 | 243 | 3,280 | 174 | 261 |
| 6.0 | 506 | 109 | 164 | 713 | 116 | 174 | 965 | 124 | 186 | 1,250 | 133 | 200 | 1,560 | 144 | 216 | 1,920 | 153 | 230 | 2,320 | 160 | 240 | 2,710 | 167 | 251 | 3,150 | 180 | 270 |
| 6.2 | 472 | 113 | 169 | 669 | 120 | 180 | 909 | 128 | 192 | 1,180 | 138 | 207 | 1,480 | 149 | 223 | 1,820 | 158 | 237 | 2,210 | 165 | 248 | 2,600 | 173 | 260 | 3,020 | 186 | 279 |
| 6.4 | 442 | 116 | 175 | 628 | 124 | 186 | 857 | 132 | 199 | 1,110 | 142 | 213 | 1,400 | 154 | 230 | 1,730 | 163 | 245 | 2,110 | 171 | 256 | 2,490 | 179 | 268 | 2,910 | 192 | 288 |
| 6.6 | 413 | 120 | 180 | 590 | 128 | 192 | 808 | 137 | 205 | 1,050 | 147 | 220 | 1,330 | 158 | 238 | 1,650 | 169 | 253 | 2,010 | 176 | 264 | 2,380 | 184 | 276 | 2,790 | 198 | 297 |
| 6.8 | 386 | 124 | 185 | 553 | 132 | 197 | 761 | 141 | 211 | 990 | 151 | 227 | 1,260 | 163 | 245 | 1,560 | 174 | 260 | 1,910 | 181 | 272 | 2,280 | 190 | 285 | 2,690 | 204 | 306 |
| 7.0 | 360 | 127 | 191 | 518 | 135 | 203 | 716 | 145 | 217 | 933 | 156 | 233 | 1,190 | 168 | 252 | 1,480 | 179 | 268 | 1,820 | 187 | 280 | 2,180 | 195 | 293 | 2,580 | 210 | 315 |
| 7.2 | 336 | 131 | 196 | 485 | 139 | 209 | 672 | 149 | 223 | 878 | 160 | 240 | 1,120 | 173 | 259 | 1,400 | 184 | 276 | 1,720 | 192 | 288 | 2,070 | 201 | 301 | 2,470 | 216 | 324 |
| 7.4 | 312 | 135 | 202 | 451 | 143 | 215 | 628 | 153 | 230 | 822 | 164 | 247 | 1,060 | 178 | 266 | 1,320 | 189 | 283 | 1,630 | 197 | 296 | 1,970 | 207 | 310 | 2,350 | 222 | 333 |
| 7.6 | 287 | 138 | 207 | 417 | 147 | 221 | 583 | 157 | 236 | 765 | 169 | 253 | 980 | 182 | 274 | 1,230 | 194 | 291 | 1,530 | 203 | 304 | 1,850 | 212 | 318 | 2,230 | 228 | 342 |
| 7.8 | 261 | 142 | 213 | 380 | 151 | 226 | 533 | 161 | 242 | 701 | 173 | 260 | 901 | 187 | 281 | 1,140 | 199 | 299 | 1,410 | 208 | 312 | 1,720 | 218 | 327 | 2,090 | 234 | 351 |
| 8.0 | 214 | 145 | 218 | 314 | 155 | 232 | 444 | 166 | 248 | 587 | 178 | 267 | 758 | 192 | 288 | 960 | 204 | 306 | 1,200 | 213 | 320 | 1,480 | 223 | 335 | 1,810 | 240 | 360 |

TABLE NOTES:

“NC” DENOTES NORMAL CROSS SLOPE.

“RC” DENOTES REMOVE ADVERSE CROSS SLOPE,
SUPERELEVATE AT NORMAL CROSS SLOPE.

“e” DENOTES THE SUPERELEVATION IN PERCENT (%).


“L” THE LENGTH OF SUPERELEVATION RUNOFF AND
WIDENING TRANSITION IN FEET FOR A 2 LANE
ROADWAY.

THE L1 COLUMN IS FOR 1 LANE ROTATED
THE L2 COLUMN IS FOR 2 LANES ROTATED

1 LANE ROTATED IS TYPICALLY FOR A 2-LANE HIGHWAY
2 LANE ROTATED IS TYPICALLY FOR A 4-LANE HIGHWAY


WHEN USING ONE OF THE TABLES FOR A GIVEN
RADIUS, INTERPOLATION IS NOT NECESSARY AS
THE SUPERELEVATION RATE SHOULD BE
DETERMINED FROM A RADIUS EQUAL TO, OR
SLIGHTLY SMALLER THAN, THE REDII
PROVIDED IN THE TABLE. THE RESULT IS A
SUPERELEVATION RATE THAT IS ROUNDED UP
TO THE NEAREST 0.2 OF A PERCENT.

EXAMPLE: A 50 MPH CURVE WITH A MAXIMUM
SUPERELEVATION RATE OF 8 PERCENT, AND A RADIUS
OF 1,910 FT, SHOULD USE THE RADIUS OF 1,830 FT
TO OBTAIN A SUPERELEVATION RATE OF 5.4 PERCENT.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)




STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER

| "W" | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------|-----|-----|-----|-----|-----|-----|--------------------|------|-----|-----|-----|-----|-----|--------------------|------|------|-----|-----|-----|-----|
| CALCULATED AND DESIGN VALUES FOR TRAVELED WAY WIDENING ON OPEN HIGHWAY CURVES (TWOLANE HIGHWAYS, ONE-WAY OR TWO-WAY)[WB-67 ADJUSTMENT] | | | | | | | | | | | | | | | | | | | | | |
| CURVE RADIUS (FT) | 24' ROADWAY WIDTH | | | | | | | 22' ROADWAY WIDTH | | | | | | | 20' ROADWAY WIDTH | | | | | | |
| | DESIGN SPEED (MPH) | | | | | | | DESIGN SPEED (MPH) | | | | | | | DESIGN SPEED (MPH) | | | | | | |
| | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 7000 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.1 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 |
| 6500 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.1 | 1.2 | 1.8 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.2 |
| 6000 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.8 | 0.9 | 1.0 | 1.0 | 1.1 | 1.2 | 1.2 | 1.8 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.3 |
| 5500 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.9 | 1.0 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.4 |
| 5000 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.5 | 1.0 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.4 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.5 |
| 4500 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.6 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.4 | 1.5 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.6 |
| 4000 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.7 | 1.1 | 1.2 | 1.3 | 1.3 | 1.4 | 1.5 | 1.6 | 2.1 | 2.2 | 2.3 | 2.3 | 2.4 | 2.5 | 2.7 |
| 3500 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.6 | 0.8 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.6 | 1.7 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.6 | 2.8 |
| 3000 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.4 | 1.5 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.4 | 2.5 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 |
| 2500 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.7 | 2.8 | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 |
| 2000 | 0.9 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.9 | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 3.6 |
| 1800 | 1.1 | 1.2 | 1.3 | 1.5 | 1.6 | 1.7 | 1.8 | 2.1 | 2.2 | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 3.1 | 3.2 | 3.3 | 3.5 | 3.6 | 3.7 | 3.8 |
| 1600 | 1.3 | 1.4 | 1.5 | 1.7 | 1.8 | 1.9 | 2.0 | 2.3 | 2.4 | 2.5 | 2.7 | 2.8 | 2.9 | 3.0 | 3.3 | 3.4 | 3.5 | 3.7 | 3.8 | 3.9 | 4.0 |
| 1400 | 1.6 | 1.8 | 1.9 | 2.0 | 2.2 | 2.3 | 2.4 | 2.6 | 2.8 | 2.9 | 3.0 | 3.2 | 3.3 | 3.4 | 3.6 | 3.8 | 3.9 | 4.0 | 4.4 | 4.3 | 4.4 |
| 1200 | 2.0 | 2.1 | 2.2 | 2.4 | 2.5 | 2.7 | 2.8 | 3.0 | 3.1 | 3.2 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.2 | 4.4 | 4.5 | 4.7 | 4.8 |
| 1000 | 2.5 | 2.7 | 2.8 | 3.0 | 3.1 | 3.3 | 3.4 | 3.5 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.4 | 4.5 | 4.7 | 4.8 | 5.0 | 5.1 | 5.3 | 5.4 |
| 900 | 2.8 | 3.0 | 3.1 | 3.3 | 3.5 | 3.6 | | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 | 4.6 | | 4.8 | 5.0 | 5.1 | 5.3 | 5.5 | 5.6 | |
| 800 | 3.2 | 3.4 | 3.6 | 3.8 | 4.0 | 4.1 | | 4.2 | 4.4 | 4.6 | 4.8 | 5.0 | 5.1 | | 5.2 | 5.4 | 5.6 | 5.8 | 6.0 | 6.1 | |
| 700 | 3.8 | 4.0 | 4.2 | 4.4 | 4.6 | | | 4.8 | 5.0 | 5.2 | 5.4 | 5.6 | | | 5.8 | 6.0 | 6.2 | 6.4 | 6.6 | | |
| 600 | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 | | | 5.5 | 5.7 | 5.9 | 6.1 | 6.3 | | | 6.5 | 6.7 | 6.9 | 7.1 | 7.3 | | |
| 500 | 5.4 | 5.7 | 5.9 | 6.1 | | | | 6.4 | 6.7 | 6.9 | 7.1 | | | | 7.4 | 7.7 | 7.9 | 8.1 | | | |
| 450 | 6.1 | 6.3 | 6.6 | | | | | 7.1 | 7.3 | 7.6 | | | | | 8.1 | 8.3 | 8.6 | | | | |
| 400 | 6.9 | 7.1 | 7.4 | | | | | 7.9 | 8.1 | 8.4 | | | | | 8.9 | 9.1 | 9.4 | | | | |
| 350 | 7.9 | 8.1 | 8.4 | | | | | 8.9 | 9.1 | 9.4 | | | | | 9.9 | 10.1 | 10.4 | | | | |
| 300 | 9.2 | 9.5 | | | | | | 10.2 | 10.5 | | | | | | 11.2 | 11.5 | | | | | |
| 250 | 11.2 | | | | | | | 12.2 | | | | | | | 13.2 | | | | | | |
| 200 | 14.0 | | | | | | | 15.0 | | | | | | | 16.0 | | | | | | |

TABLE NOTES:

- "W" THE WIDENING IN FEET FOR SURFACING AT INSIDE SHOULDERS.
- VALUES SHOWN ARE FOR WB-67 DESIGN VEHICLE AND REPRESENT WIDENING IN FEET.
- VALUES LESS THAN 2.0 FEET MAY BE DISREGARDED.
- FOR 3-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 1.5.
- FOR 4-LANE ROADWAYS, MULTIPLY ABOVE VALUES BY 2.0.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER PE-28411

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2017

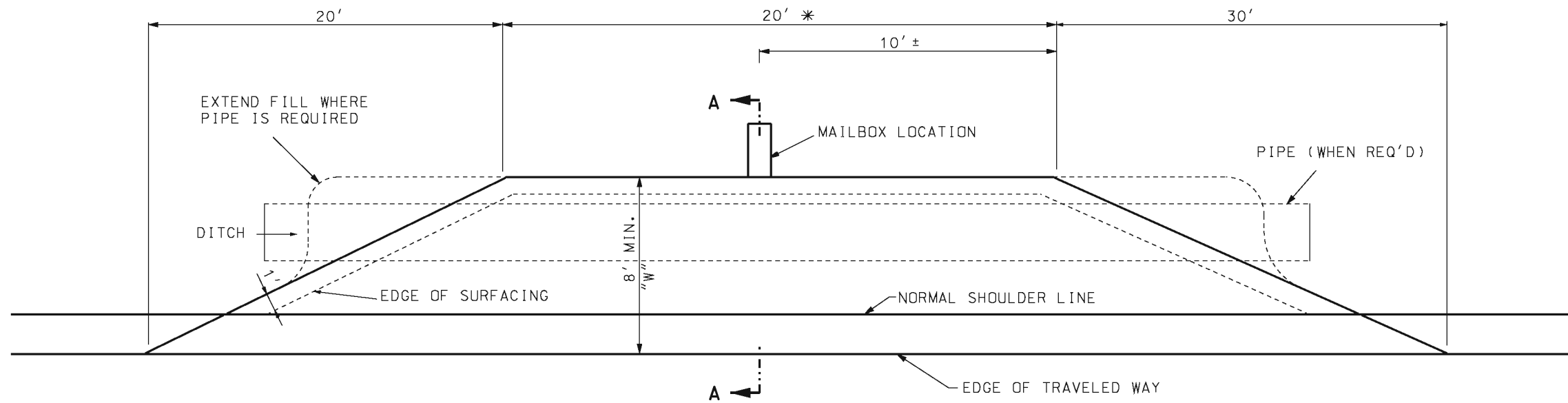
DATE PREPARED: 5/1/2017

203.22

SHEET NO.

2 OF 2

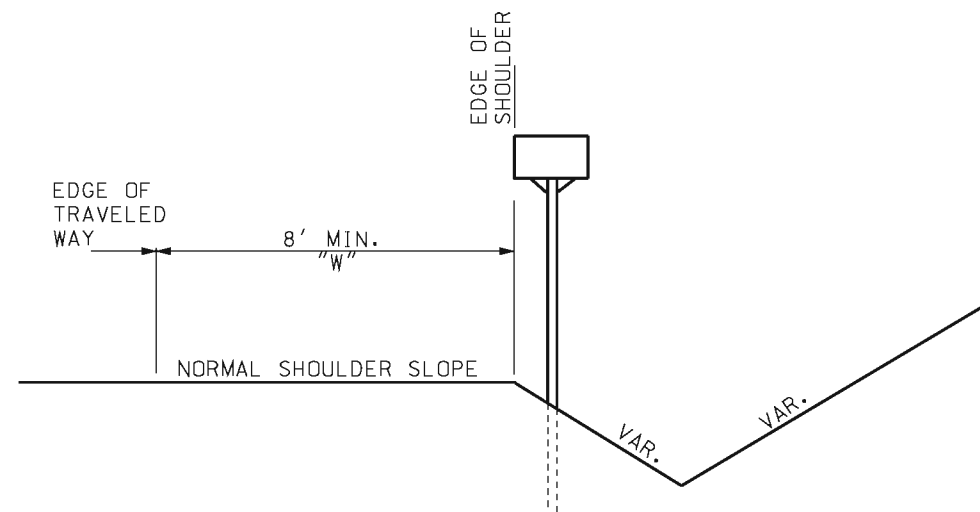
SUPERELEVATION, SPIRALS AND WIDENING



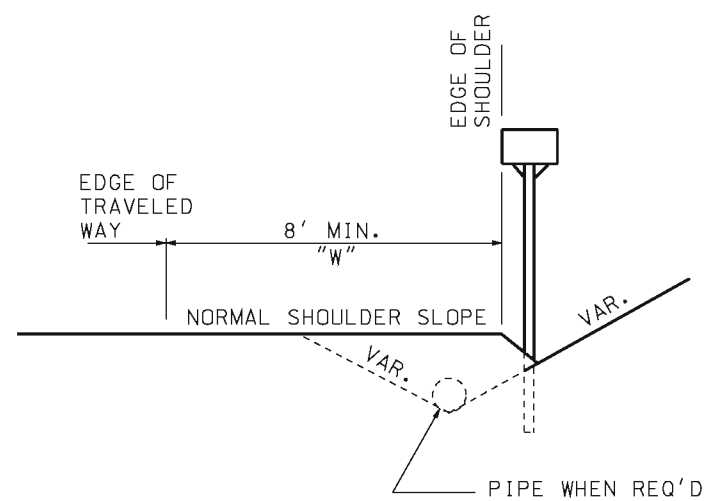
* ADD 2' FOR EACH
ADDITIONAL MAILBOX

CL PAVEMENT

PLAN



SECTION A-A
(WITHOUT PIPE)


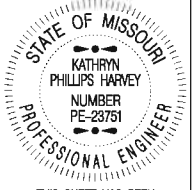


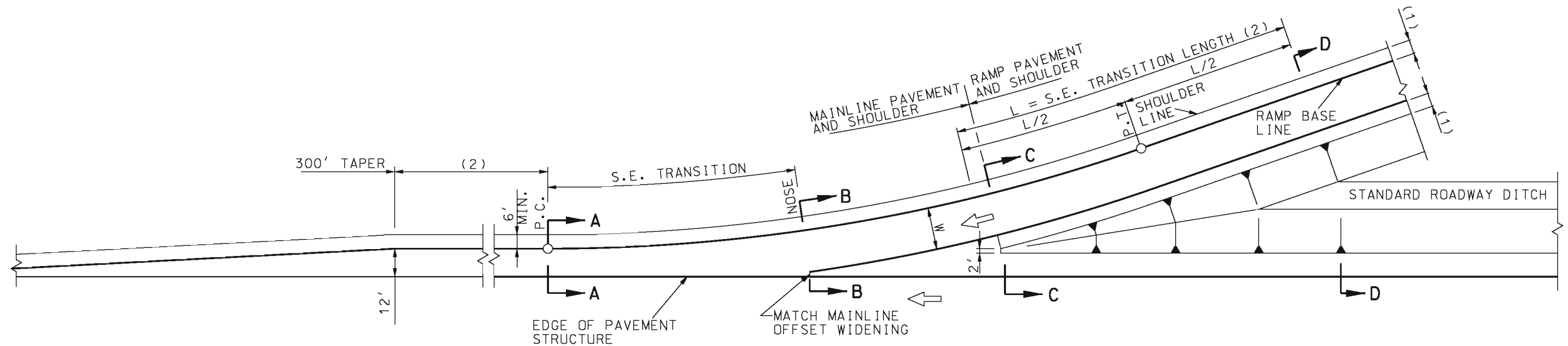
SECTION A-A
(WITH PIPE)

GENERAL NOTES:

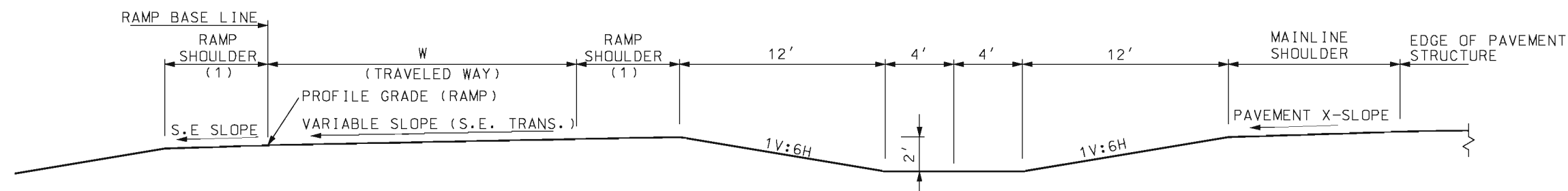
IN NO CASE WILL "W" BE LESS THAN SHOULDER WIDTH.
"W" WILL BE 8' UNLESS OTHERWISE NOTED ON THE PLANS.

WHEN ENTRANCES ARE ADJACENT TO MAILBOX TURNOUTS,
THE AREA AND SURFACING OF THE ENTRANCE MAY BE USED
FOR A PORTION OF THE MAILBOX TURNOUT.

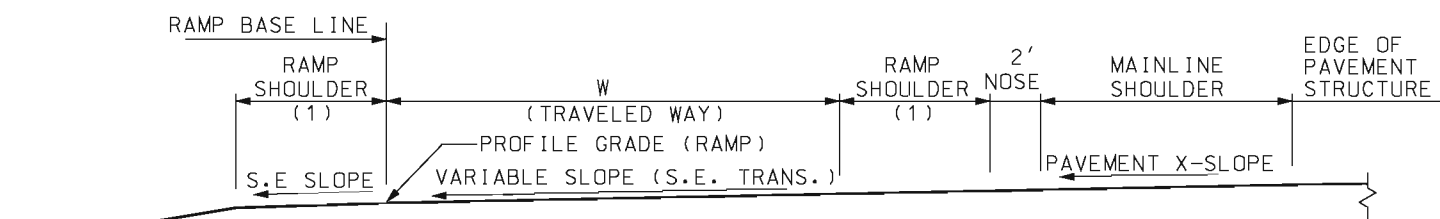
| | |
|--|-------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MAILBOX TURNOUTS |
| DATE EFFECTIVE: 08/01/1981 DATE PREPARED: 8/21/2009 | 203.35A |
| SHEET NO. 1 OF 1 | |



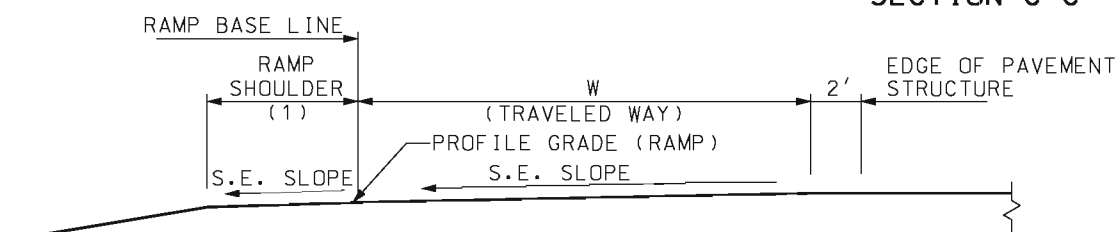
PLAN VIEW "ON" RAMPS



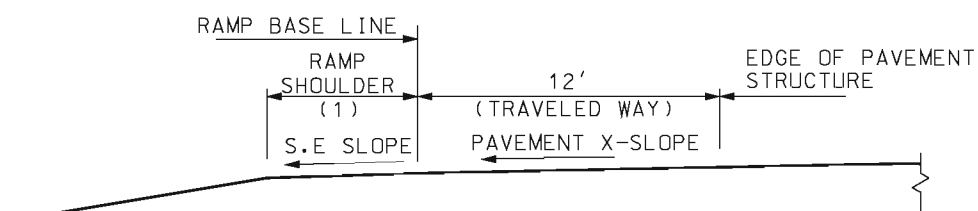
SECTION D-D



SECTION C-C



SECTION B-B



SECTION A-A

| W | RAMP WIDTH |
|-----|---|
| 14' | ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES > 5% |
| 12' | ONE LANE, ONE WAY OPERATION WITH NO PROVISION FOR PASSING STALLED VEHICLES. DESIGN TRUCK VOLUMES ≤ 5% |


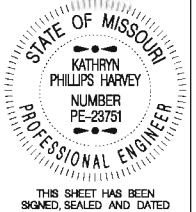
NOTES:

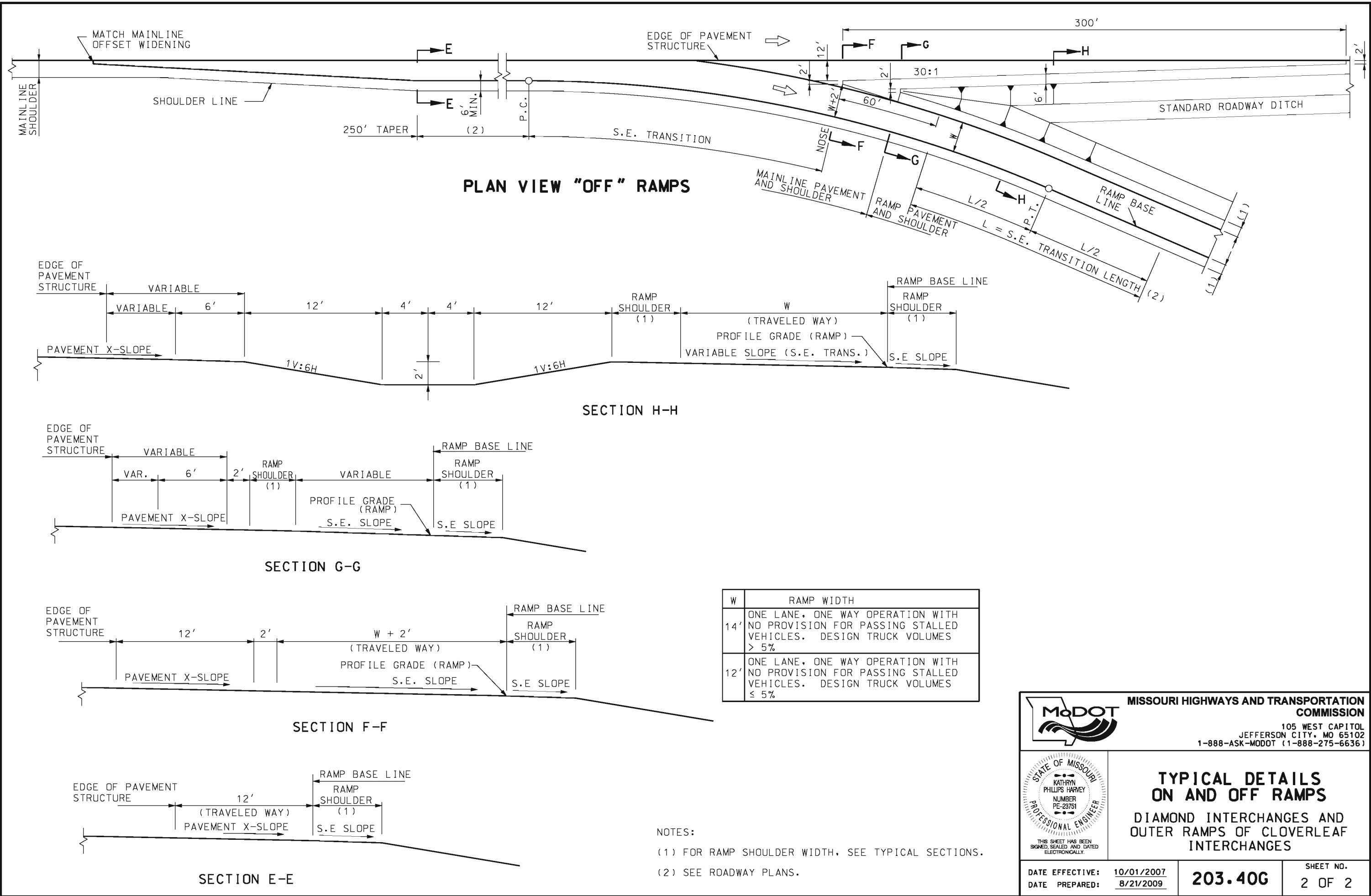
- (1) FOR RAMP SHOULDER WIDTH, SEE TYPICAL SECTIONS.
 (2) SEE ROADWAY PLANS.

GENERAL NOTES:


SEE OTHER DRAWINGS FOR JOINT LAYOUTS AND STRIPING DETAILS.

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. FOR ACTUAL CONSTRUCTION DETAILS AND PAVEMENT TYPES, SEE OTHER DRAWINGS.

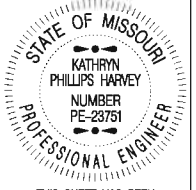
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TYPICAL DETAILS ON AND OFF RAMPS DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES |
| DATE EFFECTIVE: 10/01/2007 DATE PREPARED: 8/21/2009 | 203.40G SHEET NO. 1 OF 2 |



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



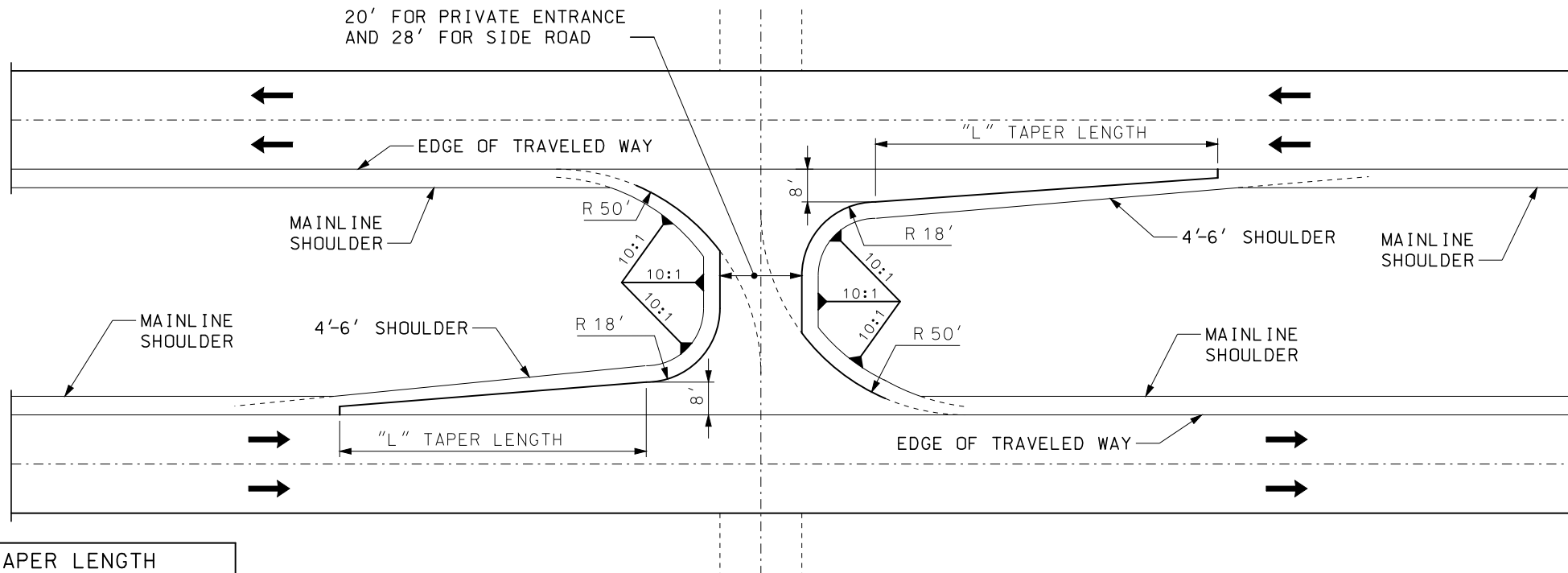
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



TYPICAL DETAILS ON AND OFF RAMPS
DIAMOND INTERCHANGES AND OUTER RAMPS OF CLOVERLEAF INTERCHANGES

| | |
|-----------------|------------|
| DATE EFFECTIVE: | 10/01/2007 |
| DATE PREPARED: | 8/21/2009 |

| | |
|----------------|---------------------|
| 203.40G | SHEET NO. 2 OF 2 |
|----------------|---------------------|



| TAPER LENGTH | |
|--------------|--------|
| DESIGN SPEED | "L" |
| ≤ 40 MPH | 112.5' |
| > 40 MPH | 225' |

FOR PRIVATE ENTRANCES, MINOR SIDE ROADS OR FIELD ENTRANCES

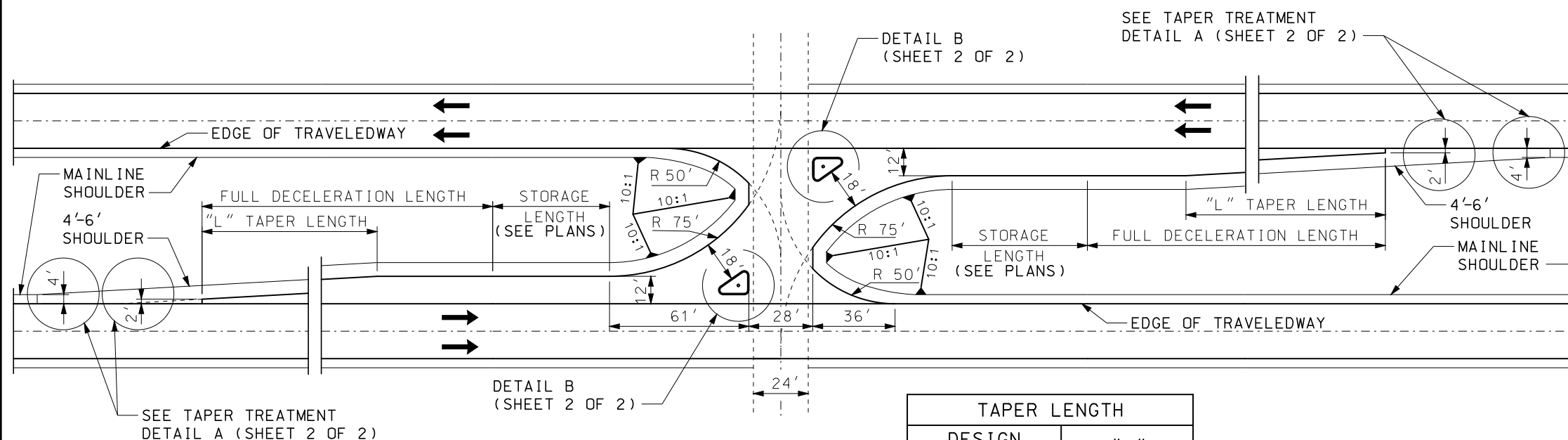
TYPE I MEDIAN OPENING

NOTES FOR TYPE I MEDIAN OPENINGS:

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.



| FULL DECELERATION LENGTH | |
|--------------------------|----------------|
| DESIGN SPEED | MINIMUM LENGTH |
| 45 MPH | 385 FT. |
| 50 MPH | 435 FT. |
| 55 MPH | 480 FT. |
| 60 MPH | 530 FT. |
| 65 MPH | 570 FT. |
| 70 MPH | 615 FT. |

| TAPER LENGTH | |
|--------------|------|
| DESIGN SPEED | "L" |
| ≤ 40 MPH | 125' |
| > 40 MPH | 250' |

FOR MAJOR SIDE ROADS, STATE ROUTES AND MAJOR COMMERCIAL ENTRANCES


TYPE II MEDIAN OPENING

NOTES FOR TYPE II MEDIAN OPENINGS:

MEDIAN OPENINGS AND TAPERS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND THICKNESS AS THE TRAVELED WAY.

SHOULDERS ADJACENT TO THE MEDIAN OPENING AND TAPERS SHALL BE A2 SHOULDERS FOR INTERSTATE AND MAJOR ROADWAYS OR A3 SHOULDERS FOR LOW VOLUME MAJORS AND MINOR ROADS.

IN ADDITION TO THE IDENTIFIED SLOPES, SLOPES ADJACENT TO MEDIAN OPENING SHOULDERS SHALL NOT BE STEEPER THAN 5.5:1.




MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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1-888-ASK-MODOT (1-888-275-6636)

TYPICAL MEDIAN OPENING

DIVIDED HIGHWAYS



THIS SHEET HAS BEEN
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ELECTRONICALLY.

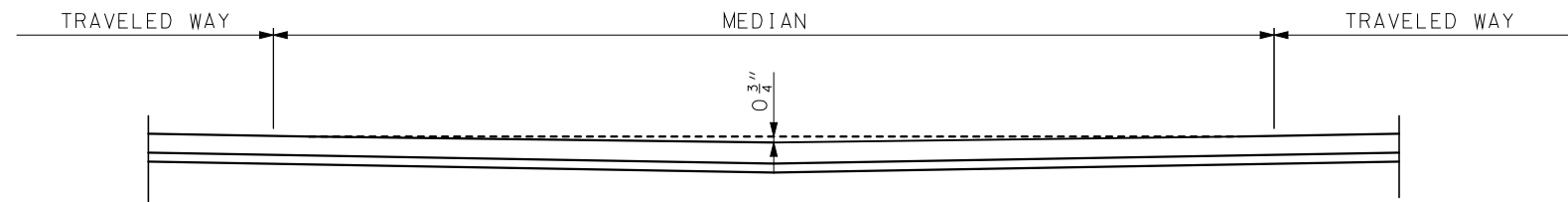
DATE EFFECTIVE: 04/01/2016

DATE PREPARED: 2/11/2016

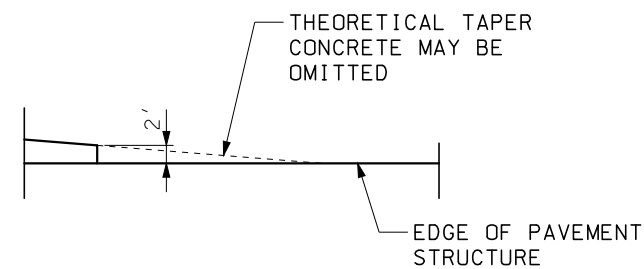
203.50N

SHEET NO.

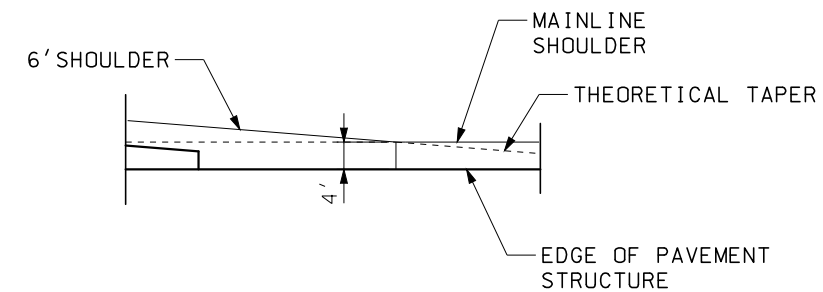
1 OF 2



SECTION ALONG MEDIAN OPENING ϕ

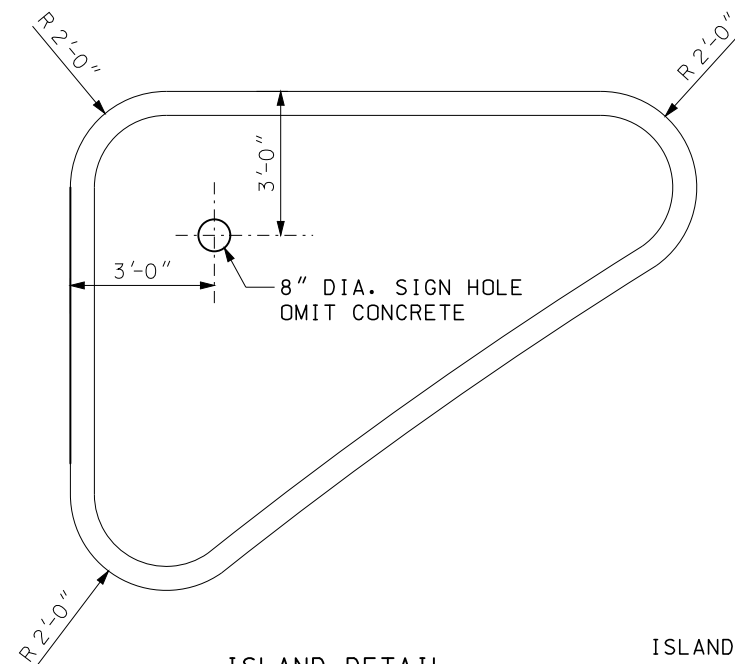


TAPER TREATMENT



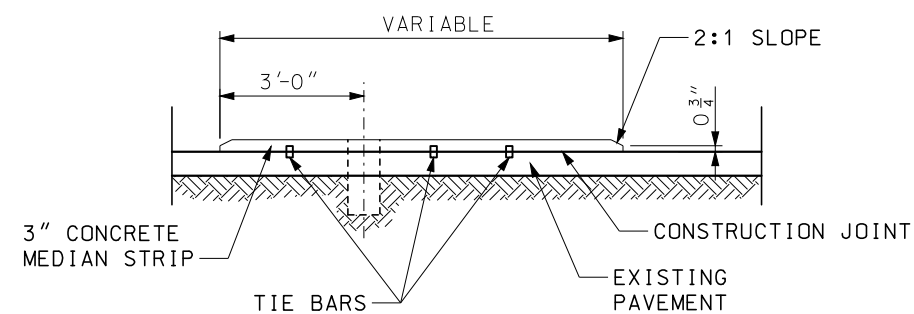
SHOULDER TAPER TREATMENT

DETAIL A



ISLAND DETAIL

ISLAND WILL BE PAID FOR AS CONCRETE MEDIAN STRIP.

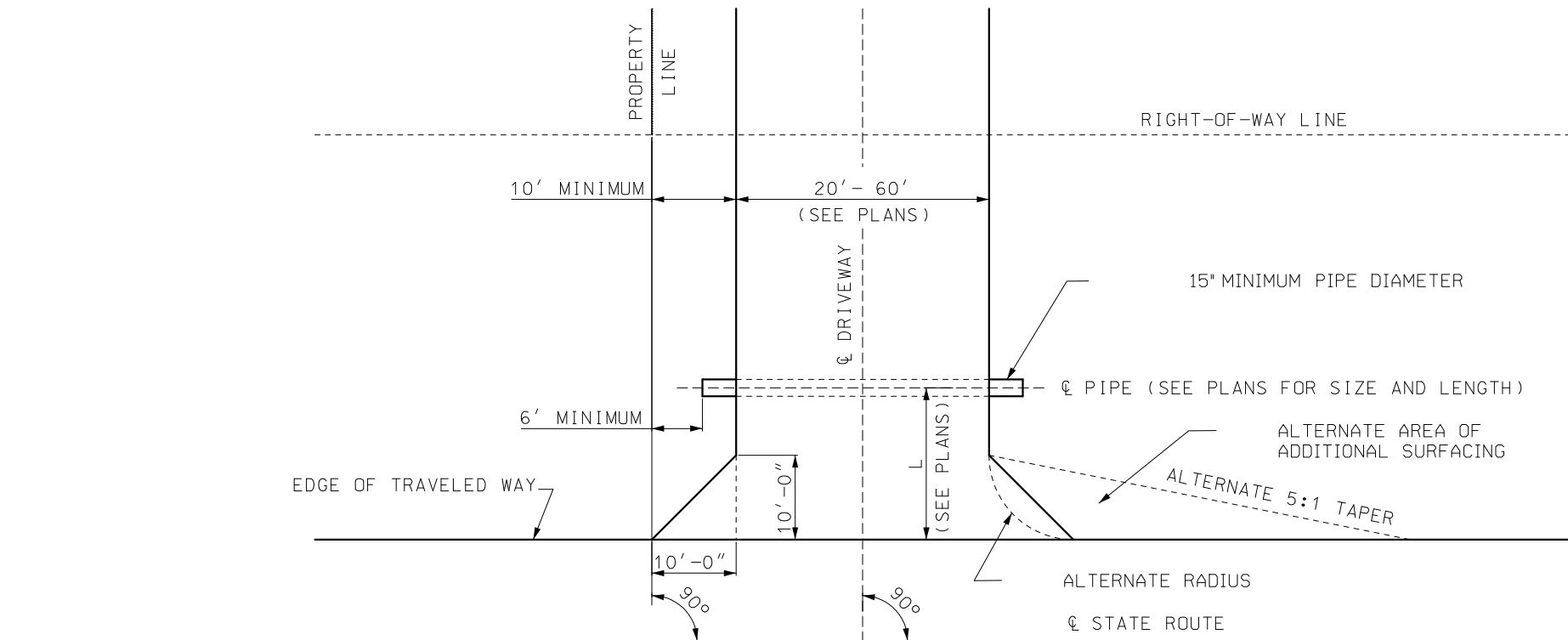


LOW PROFILE ISLAND DETAIL

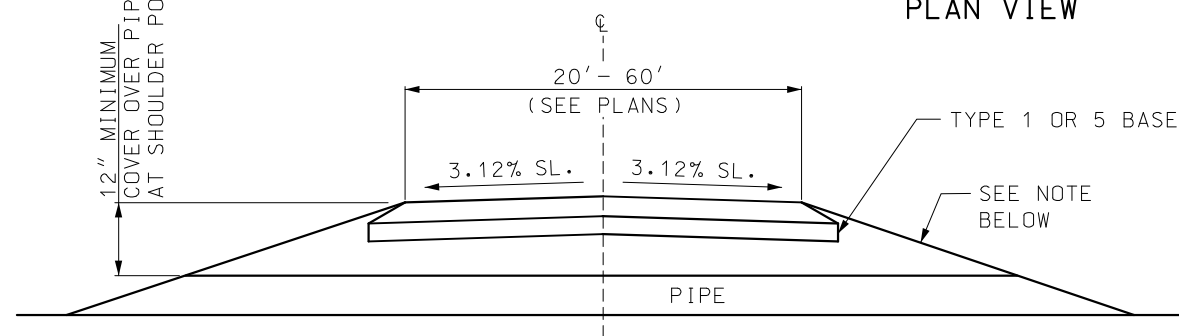
DETAIL B

GENERAL NOTES:
FOR DETAILS ON CONCRETE MEDIAN STRIP CONSTRUCTION, SEE STANDARD
PLAN 608.30.

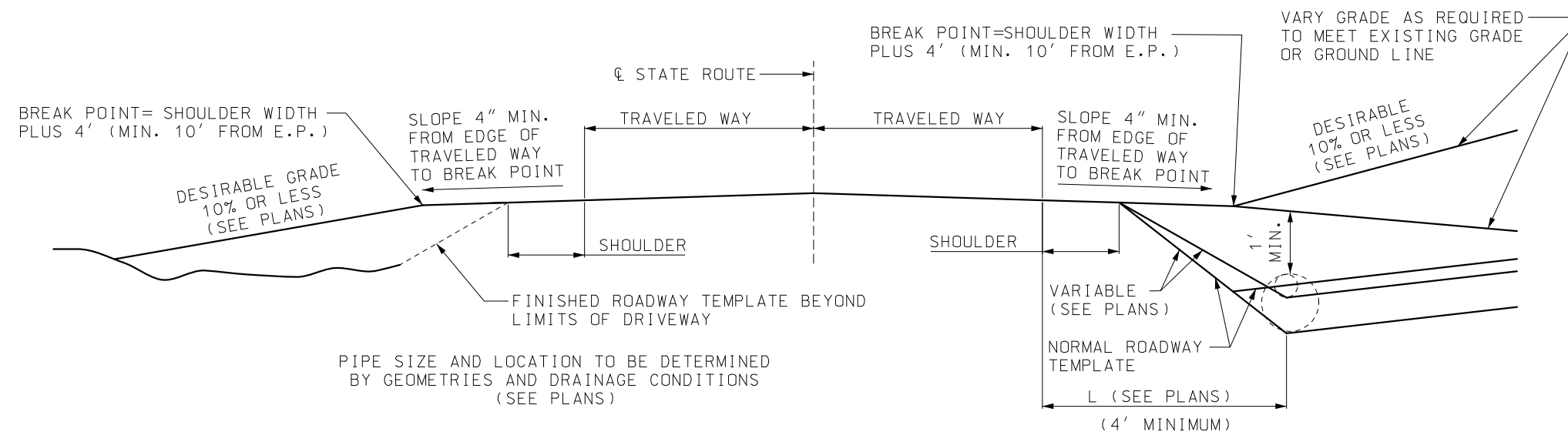
| | | | |
|--|----------------|--|--|
| | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | | |
| | | TYPICAL MEDIAN OPENING DIVIDED HIGHWAYS | |
| DATE EFFECTIVE: 04/01/2016 DATE PREPARED: 2/11/2016 | 203.50N | SHEET NO. 2 OF 2 | |



PLAN VIEW



DRIVEWAY TYPICAL SECTION



IN FILLS

IN CUTS

PROFILE VIEW

DRIVEWAY SIDE SLOPES: *

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

NOTE: RECOMMENDED WIDTH OF DRIVEWAY - 20'

* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES, THE LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE 1988 EDITION OF "ROADSIDE DESIGN GUIDE".

GENERAL NOTES:


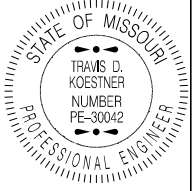
NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED BEYOND THE PROPERTY FRONTAGE.

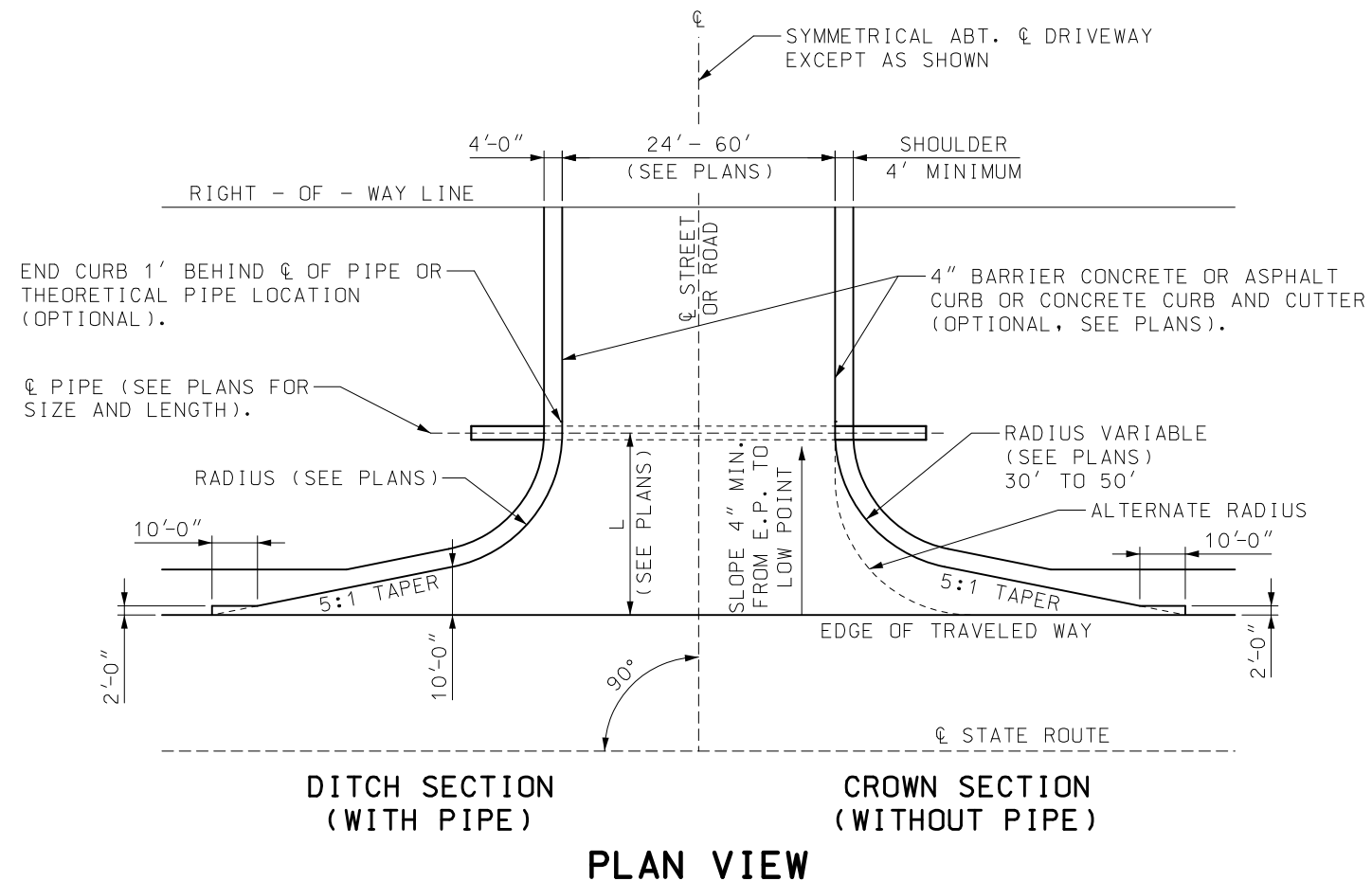
SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

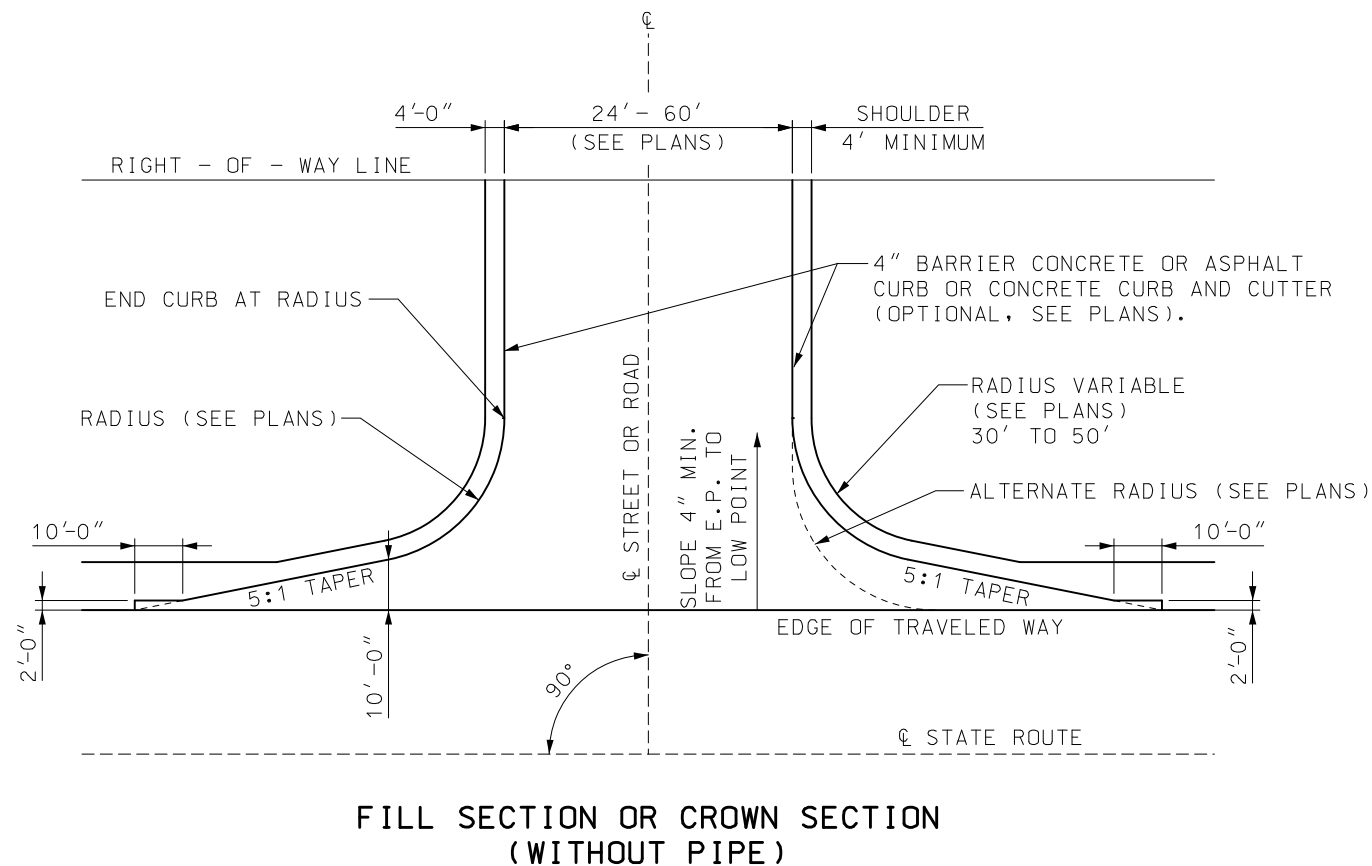
LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH. (MINIMUM 32' LENGTH OF MINIMUM 15" DIAMETER PIPE), SEE PLANS.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

| | |
|--|----------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | DRIVEWAY TYPE I |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 203.61B |
| SHEET NO. 1 OF 1 | |



PLAN VIEW



PLAN VIEW

GENERAL NOTES:

RECOMMENDED WIDTH OF ROADWAY - 24' WITHOUT PARKING ON ROAD AND 32' WITH PARKING ON ROAD.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OF 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF ASPHALT AND CONCRETE DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).


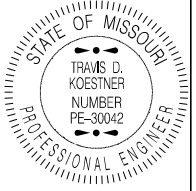
IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLANS 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

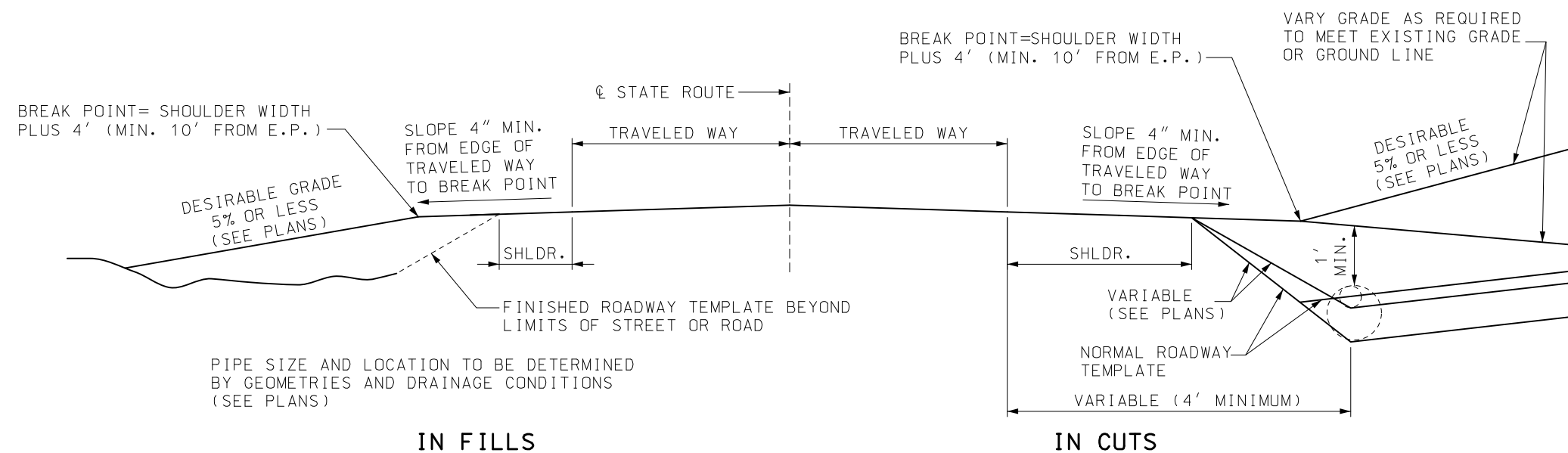
THIS DRAWING ILLUSTRATES DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

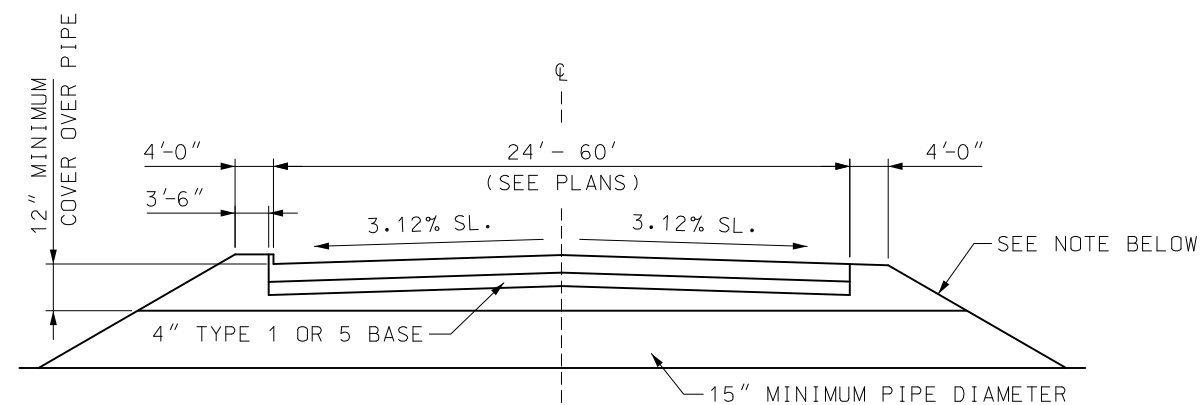
A MINIMUM 100-FOOT SIGHT DISTANCE TRIANGLE, MEASURED ALONG THE CENTERLINE OF THE INTERSECTING ROADWAYS, SHOULD BE PROVIDED.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>DRIVEWAY TYPE II</p> |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | <p>203.62E</p> |
| SHEET NO. 1 OF 2 | |

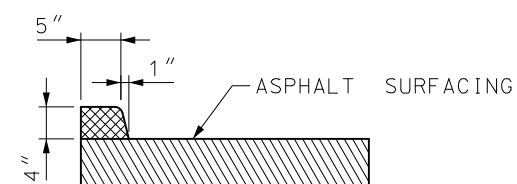
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



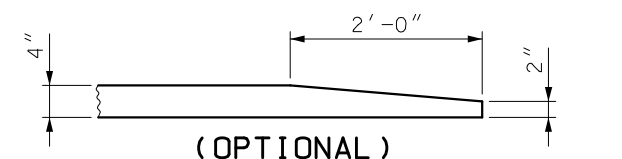
PROFILE



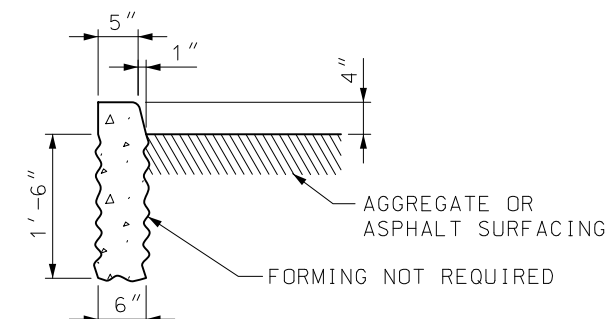
WITH CURB
WITHOUT CURB
DRIVEWAY TYPICAL SECTION



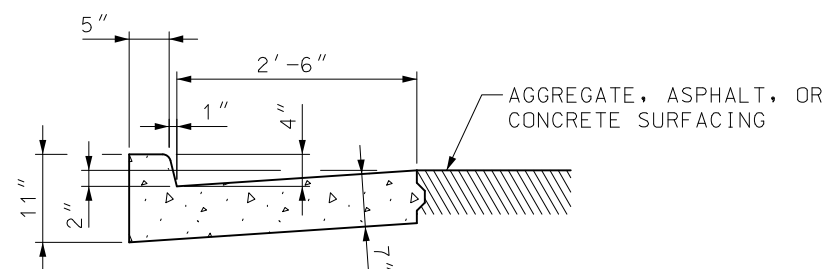
SECTION THRU 4" ASPHALT CURB



(OPTIONAL)
CURB TERMINUS
DETAIL



SECTION THRU 4" BARRIER CURB




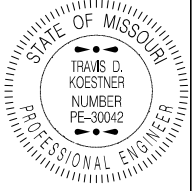
SECTION THRU CONCRETE
CURB AND GUTTER

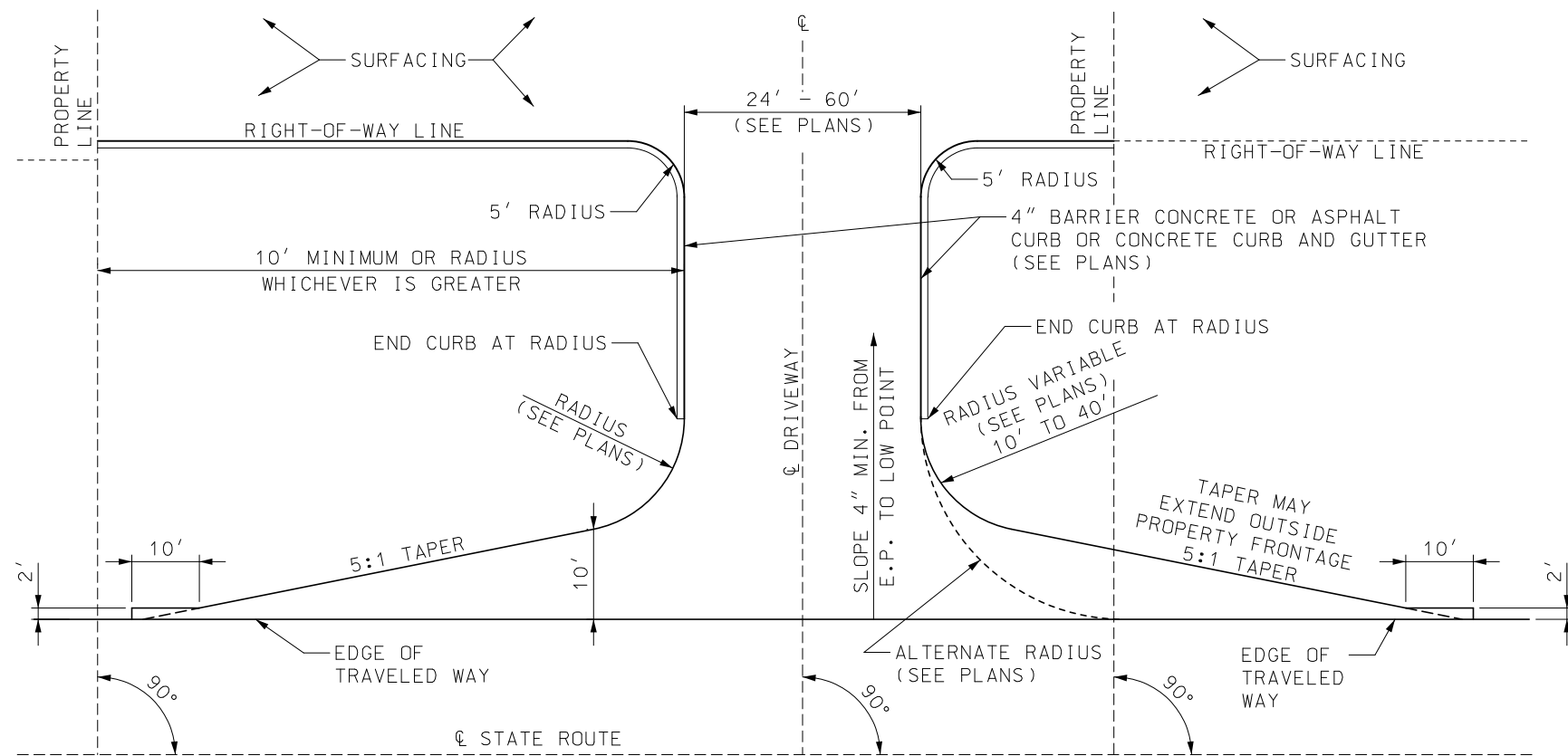
DRIVEWAY SIDE SLOPES: *

1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE
(OR 6:1 SLOPE WHERE PRACTICABLE).

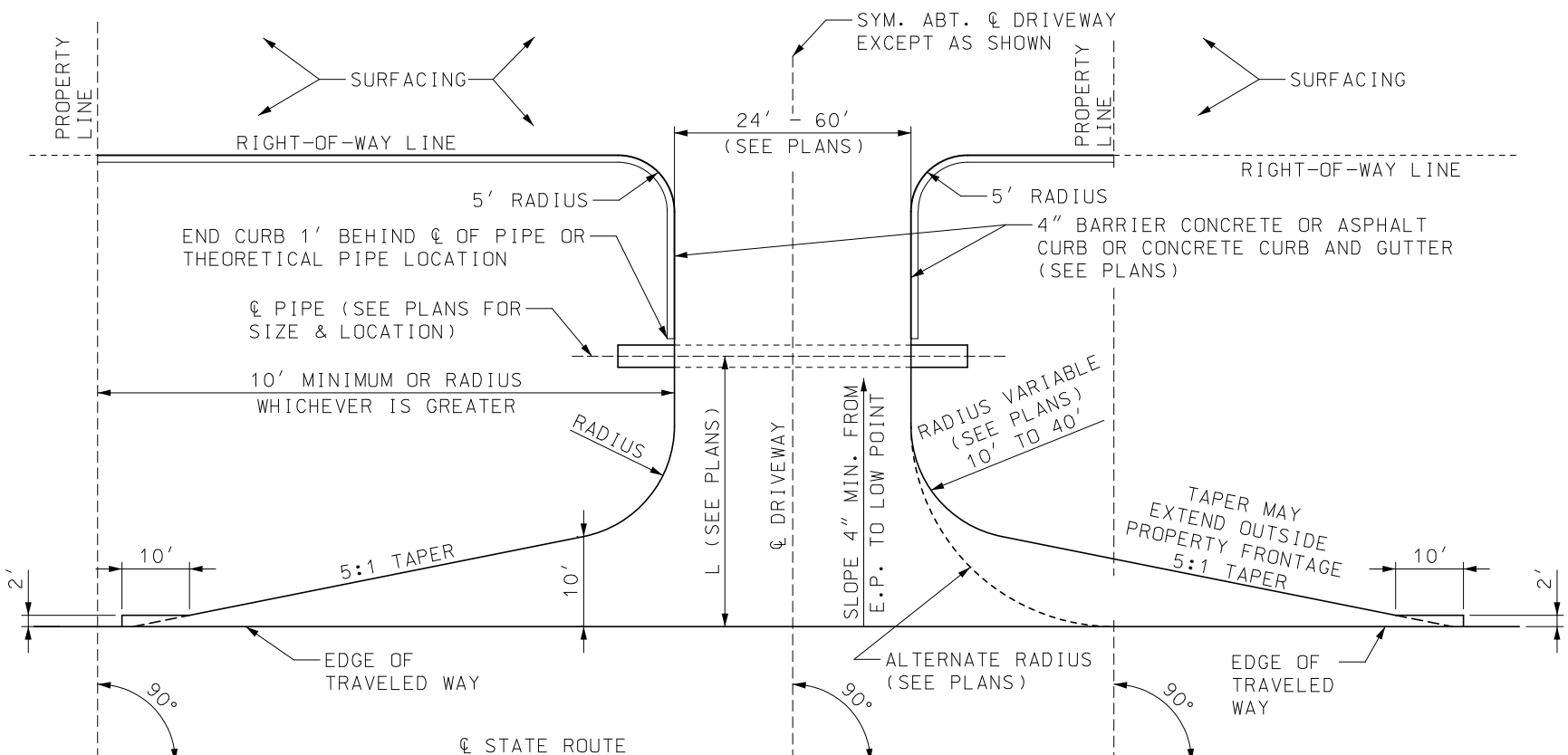
OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE
(OR FLATTER WHERE PRACTICABLE).

* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS
ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES, THE
LOCATION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE
DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".

| | |
|--|-----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | DRIVEWAY TYPE II |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 203.62E |
| SHEET NO. 2 OF 2 | |



FILL SECTION OR CROWN SECTION
(WITHOUT PIPE)
PLAN VIEW



DITCH SECTION
(WITH PIPE)
PLAN VIEW

GENERAL NOTES:

FOR LIGHT DUTY PAVEMENT (<3500 ADT) DRIVEWAY BEGINS AT EDGE OF PAVEMENT.

RECOMMENDED WIDTH OF DRIVEWAY - 40'. SKETCH OR PLAN REQUIRED.

NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED OUTSIDE OF THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.


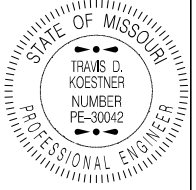
LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).

IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLAN 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH. TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

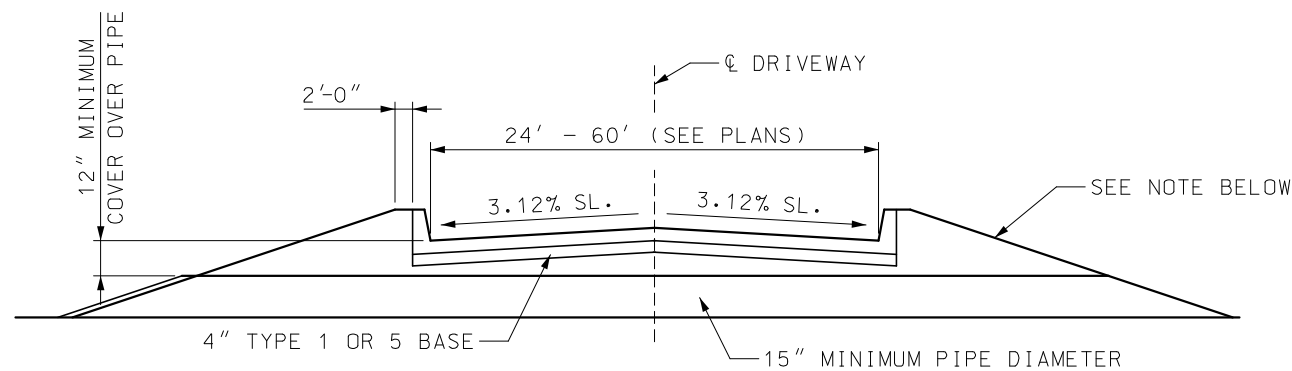
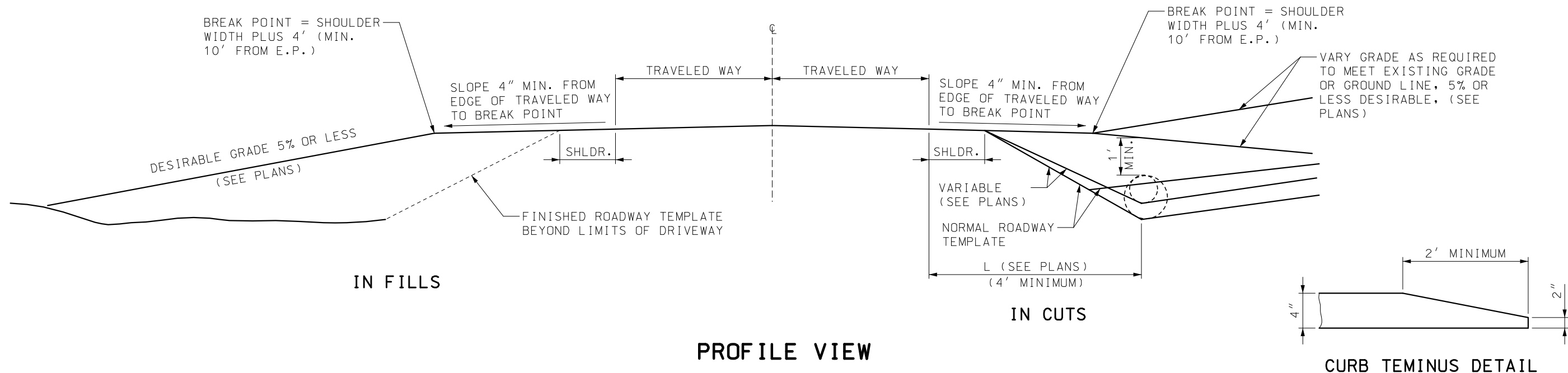
CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

| | | |
|---|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | DRIVEWAY TYPE III | |
| | DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 203.63C |

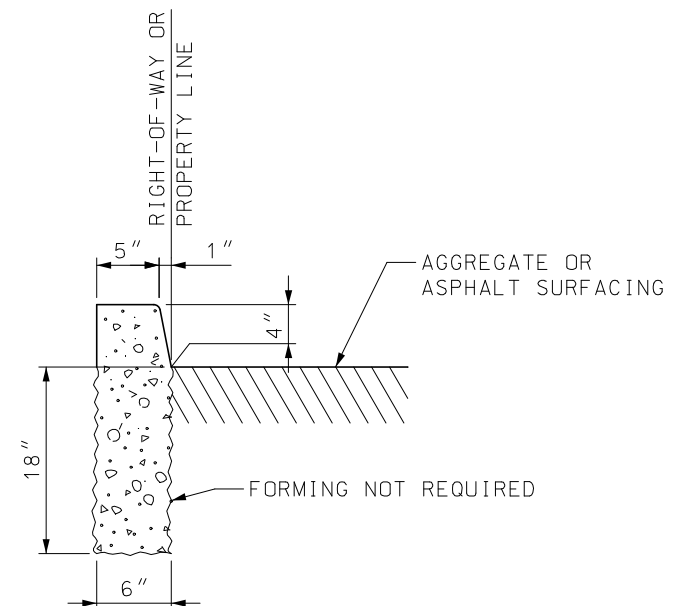
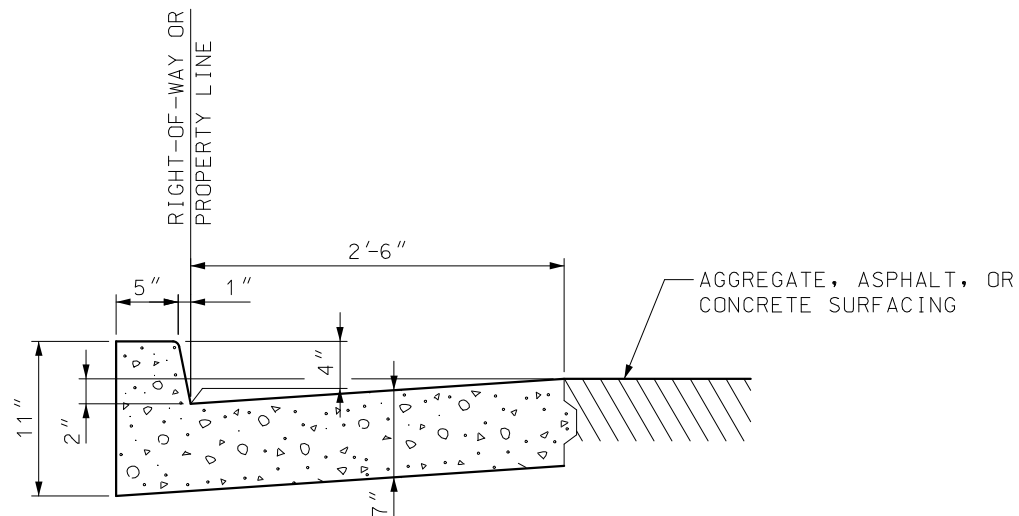
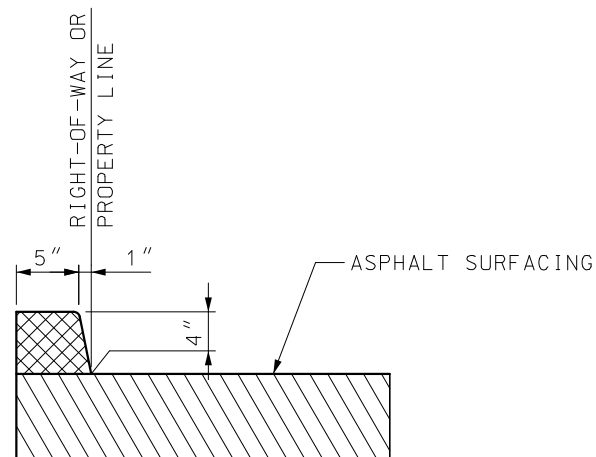
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.


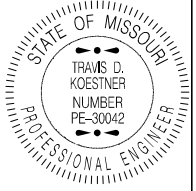


DRIVEWAY SIDE SLOPES: *

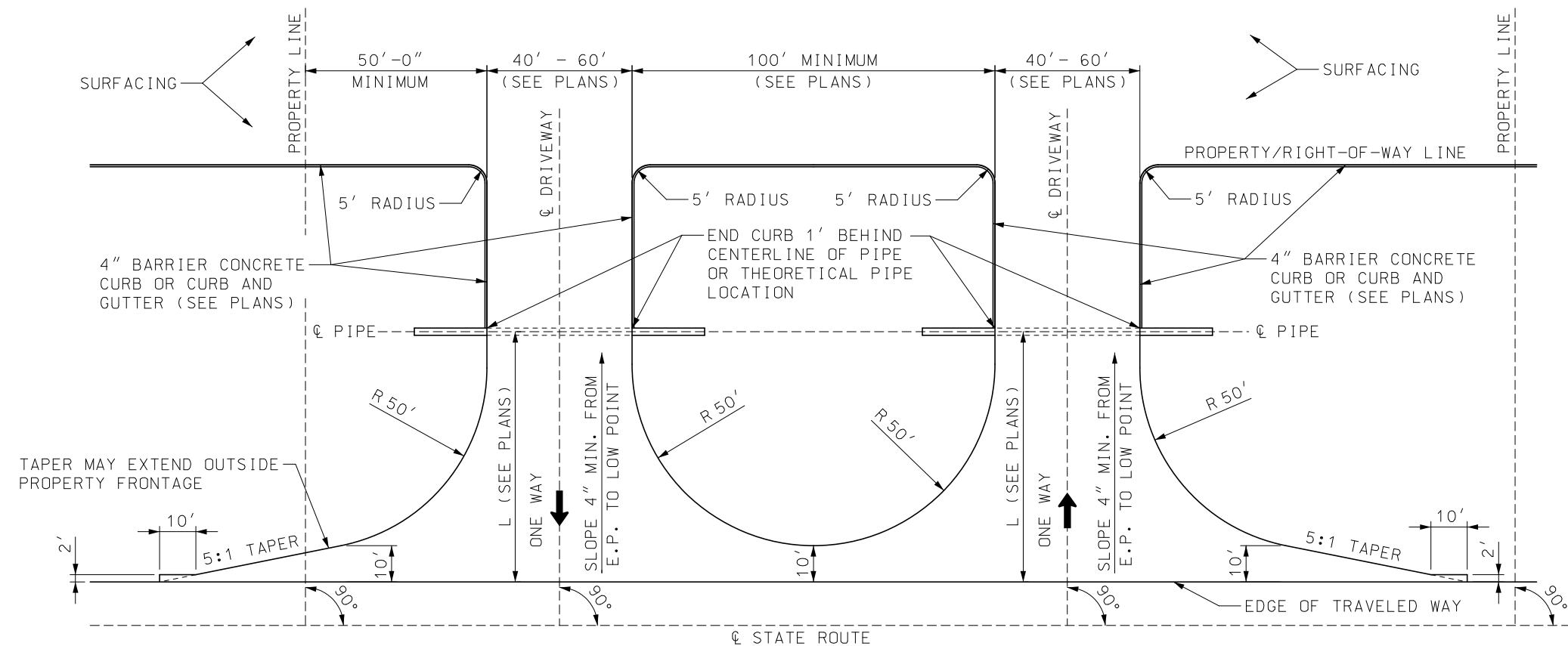
1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 WHERE PRACTICABLE).
OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).

* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPED END PIPE SECTIONS ON NEW CONSTRUCTION AND WHERE POSSIBLE ON EXISTING ROUTES, THE LOCATION OF THE DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".

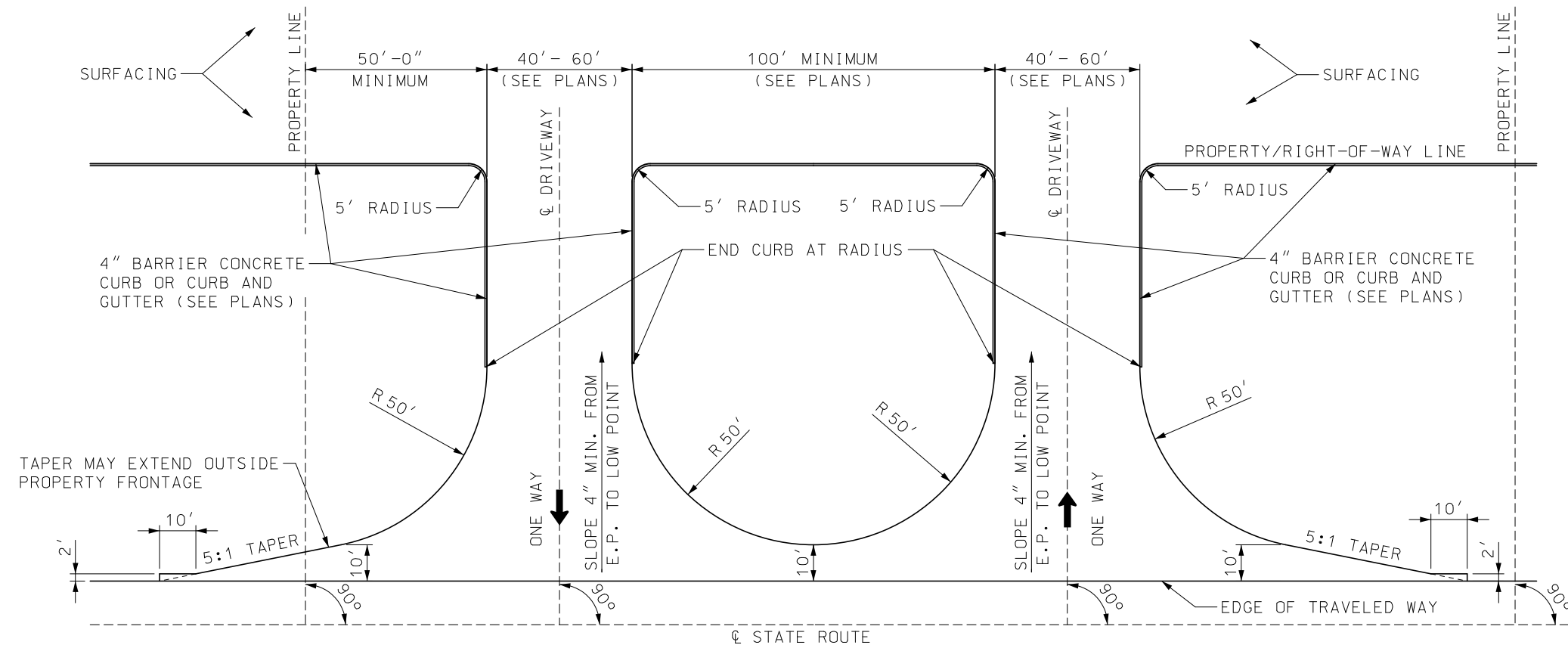


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|--|--------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | DRIVEWAY TYPE III |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 203.63C |
| SHEET NO. 2 OF 2 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**DITCH SECTION (WITH PIPE)
PLAN VIEW**



**FILL SECTION OR CROWN SECTION
(WITHOUT PIPE)
PLAN VIEW**

GENERAL NOTES:

RECOMMENDED WIDTH OF ROADWAY - 40'.

NO PART OF THE DRIVEWAY EXCLUDING TAPERS SHALL BE CONSTRUCTED OUTSIDE OF THE PROPERTY FRONTAGE.

SURFACING SHALL BE AS SHOWN ON THE PLANS OR PERMIT.

4 INCHES OF TYPE 1 OR 5 BASE SHALL BE PLACED AND COMPACTED BENEATH THE AREAL SURFACE OF CONCRETE AND ASPHALT DRIVEWAYS.

LENGTH OF PIPE SHALL BE DETERMINED BY DEPTH AND LOCATION OF DITCH, (SEE PLANS).


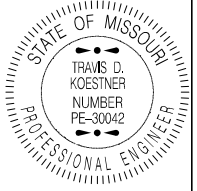
IF A PAVED APPROACH IS REQUIRED, REFER TO STANDARD PLAN 608.00 FOR CONSTRUCTION DETAILS AND CONSTRUCT CURB (IF REQUIRED) TO MEET CURB ON PAVED APPROACH, TRANSITION REQUIRED FROM 4" CURB TO 6" CURB.

CURB OR CURB AND GUTTER BETWEEN RIGHT-OF-WAY LINE AND PIPE MAY MEET LOCAL AGENCY STANDARDS.

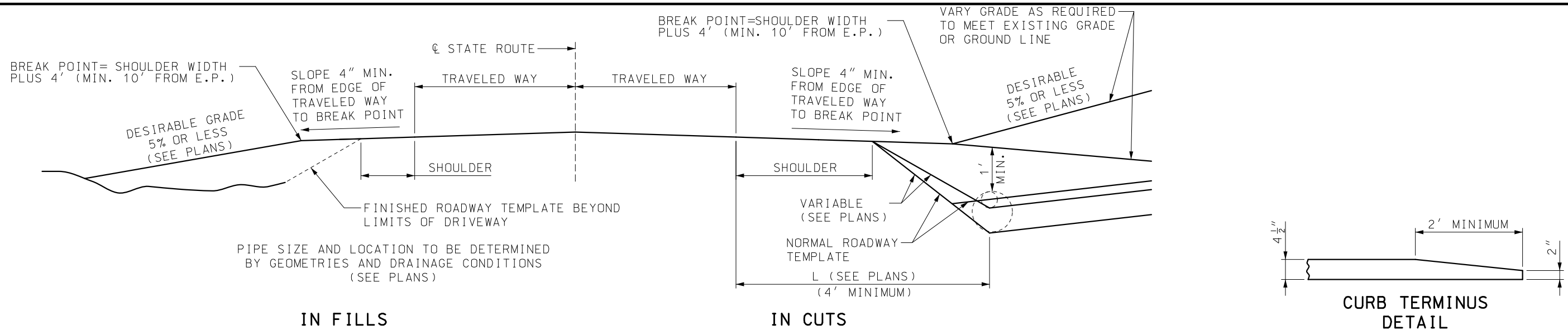
THE DRIVEWAY WIDTH SHALL BE DETERMINED AT THE TANGENT POINT OF THE RADIUS AND SIDE OF DRIVEWAY.

THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.

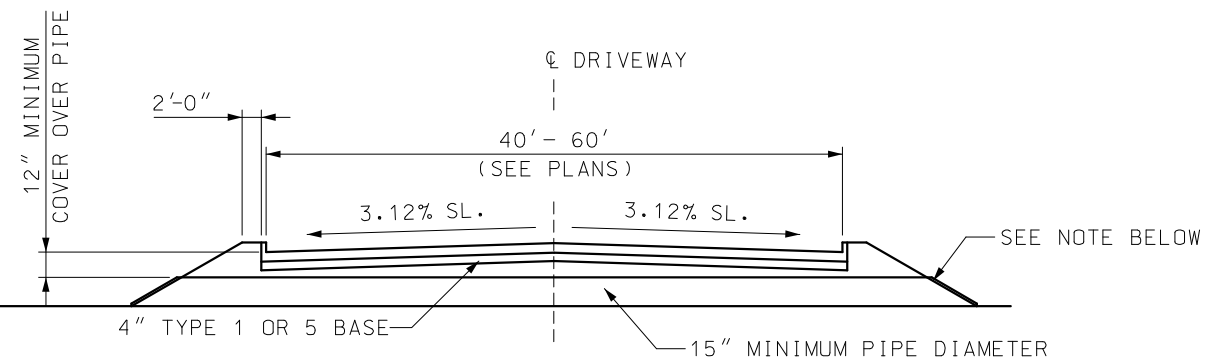
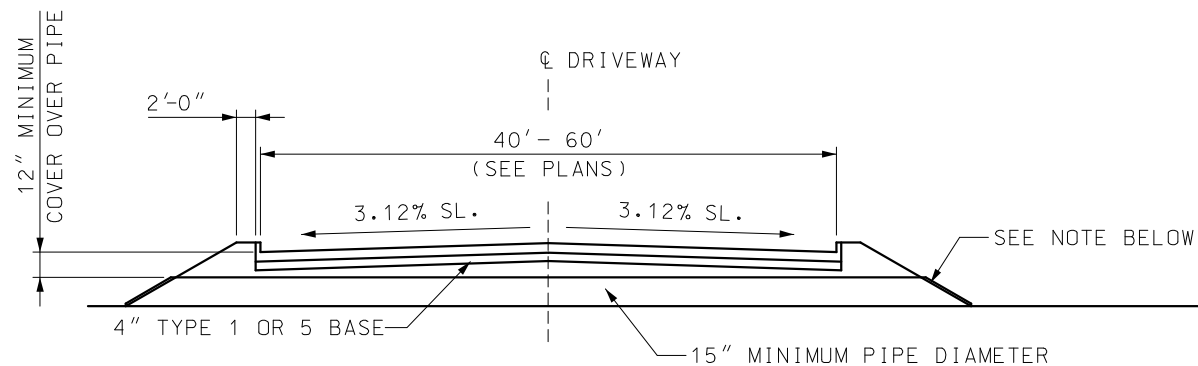
PIPE SIZE AND LOCATION TO BE DETERMINED BY GEOMETRICS AND DRAINAGE CONDITIONS (SEE PLANS).

| | |
|--|-----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | DRIVEWAY TYPE IV |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 203.64E |
| SHEET NO. 1 OF 2 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PROFILE



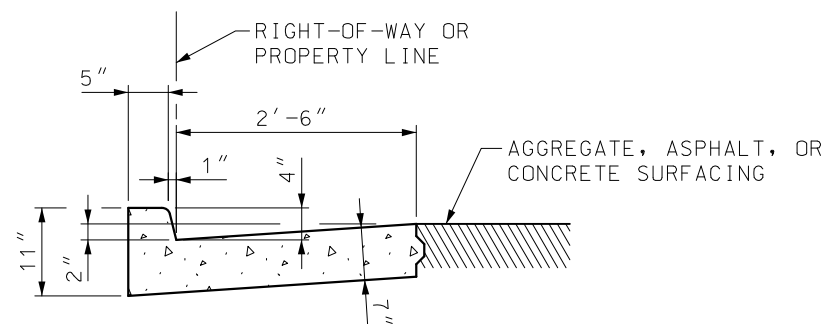
DRIVEWAY TYPICAL SECTION

DRIVEWAY SIDE SLOPES: *

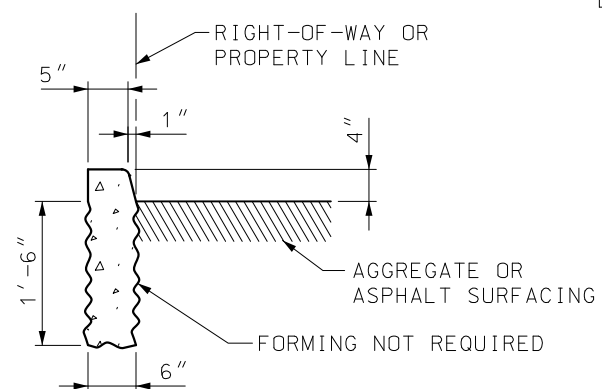
1 TO 1700 VEHICLES PER DAY ON STATE ROUTE USE 3:1 SLOPE (OR 6:1 SLOPE WHERE PRACTICABLE).

OVER 1700 VEHICLES PER DAY ON STATE ROUTE USE 6:1 SLOPE (OR FLATTER WHERE PRACTICABLE).


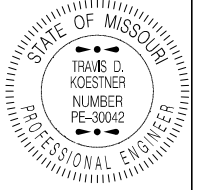
* IN ORDER TO MINIMIZE THE USE OF 6:1 SLOPE AND PIPE SECTIONS ON NEW CONSTRUCTION OF DRAINAGE PIPE SHOULD BE BEYOND THE CLEAR ZONE DISTANCE AS SHOWN IN TABLE 3.1 OF THE "ROADSIDE DESIGN GUIDE".

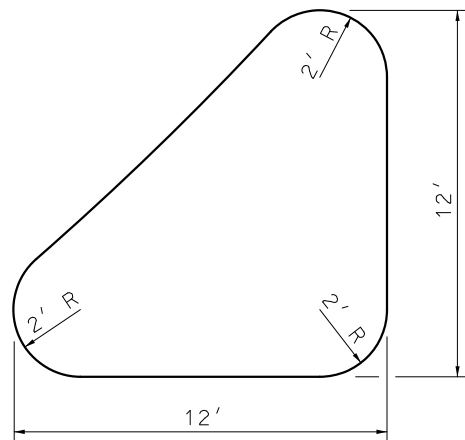


SECTION THRU CONCRETE CURB AND GUTTER



SECTION THRU 4" BARRIER CURB

| | |
|--|--------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | <p>DRIVEWAY TYPE IV</p> |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | <p>203.64E</p> |
| SHEET NO. 2 OF 2 | |



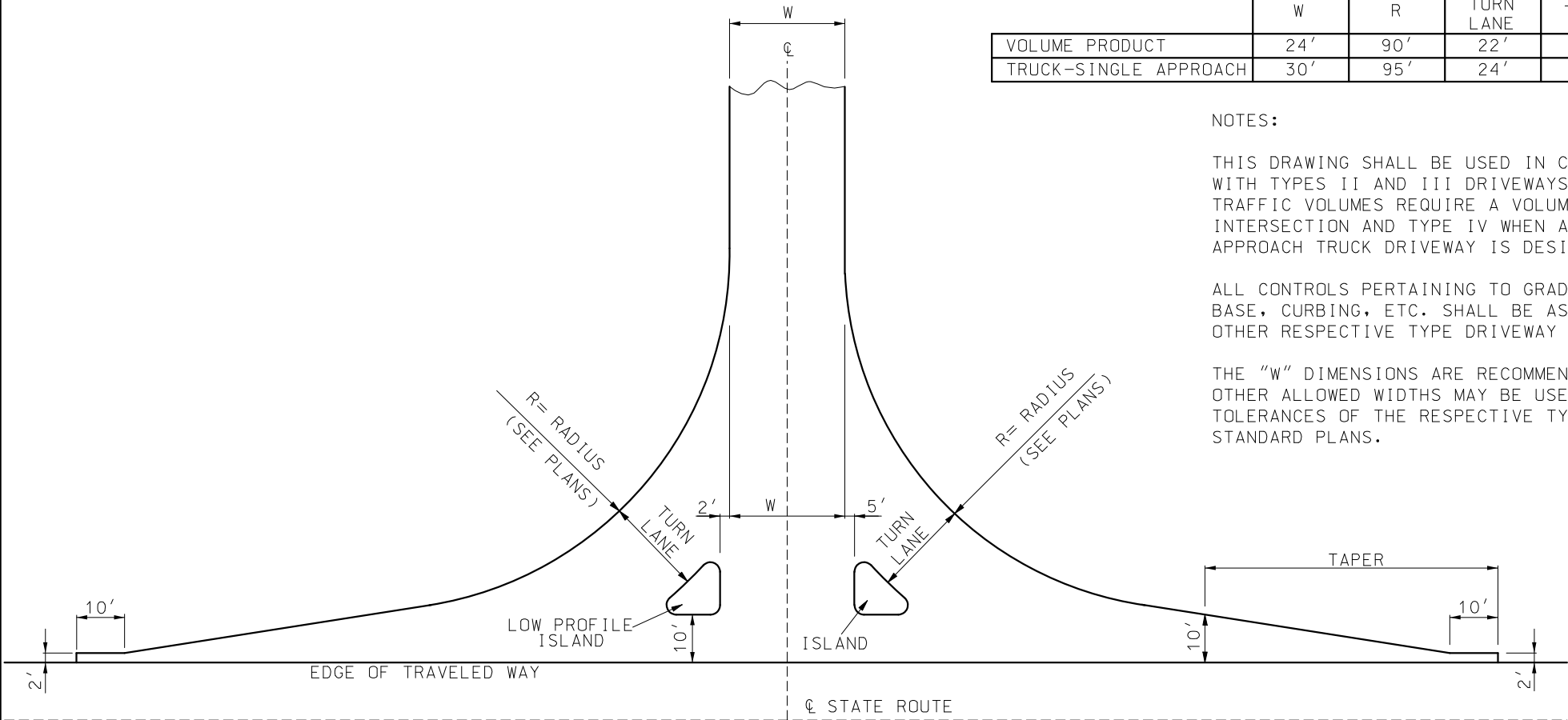
NOTE:
SEE STANDARD PLAN 203.50 FOR DETAILS OF LOW PROFILE ISLAND.
WHERE MINIMUM ISLAND CANNOT BE OBTAINED, OMIT ISLAND.

MINIMUM ISLAND DETAILS


| | W | R | MIN. TURN LANE | TAPER |
|-----------------------|-----|-----|----------------|-------|
| VOLUME PRODUCT | 24' | 90' | 22' | 5:1 |
| TRUCK-SINGLE APPROACH | 30' | 95' | 24' | 5:1 |

NOTES:
THIS DRAWING SHALL BE USED IN CONJUNCTION WITH TYPES II AND III DRIVEWAYS WHEN TRAFFIC VOLUMES REQUIRE A VOLUME PRODUCT INTERSECTION AND TYPE IV WHEN A SINGLE APPROACH TRUCK DRIVEWAY IS DESIRED.
ALL CONTROLS PERTAINING TO GRADES, DRAINAGE, BASE, CURBING, ETC. SHALL BE AS SHOWN ON OTHER RESPECTIVE TYPE DRIVEWAY STANDARD PLANS.
THE "W" DIMENSIONS ARE RECOMMENDED WIDTH. OTHER ALLOWED WIDTHS MAY BE USED WITHIN TOLERANCES OF THE RESPECTIVE TYPE DRIVEWAY STANDARD PLANS.

GENERAL NOTES:
DETAILS SHOWN ON THIS SHEET ARE FOR RIGHT ANGLE APPROACHES.
TAPER LENGTHS ARE NOT APPLICABLE WHEN DECELERATION LANES ARE PROVIDED.
SIGNALIZED INTERSECTIONS AND INTERSECTIONS IN DEVELOPED AREAS MAY BE MODIFIED TO MEET EXISTING CONDITIONS.
THIS DRAWING ILLUSTRATES DRIVEWAY DETAILS FOR MINIMUM SITUATIONS. TRAFFIC VOLUMES, SAFETY CONSIDERATIONS, DRAINAGE CONSIDERATIONS, LOCAL REQUIREMENTS, ETC., MAY DICTATE MORE EXTENSIVE IMPROVEMENTS THAN ILLUSTRATED.



PLAN VIEW



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

TRAVIS D. KOESTNER

NUMBER PE-30042

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DRIVEWAY
TYPE V

DATE EFFECTIVE: 07/01/2020

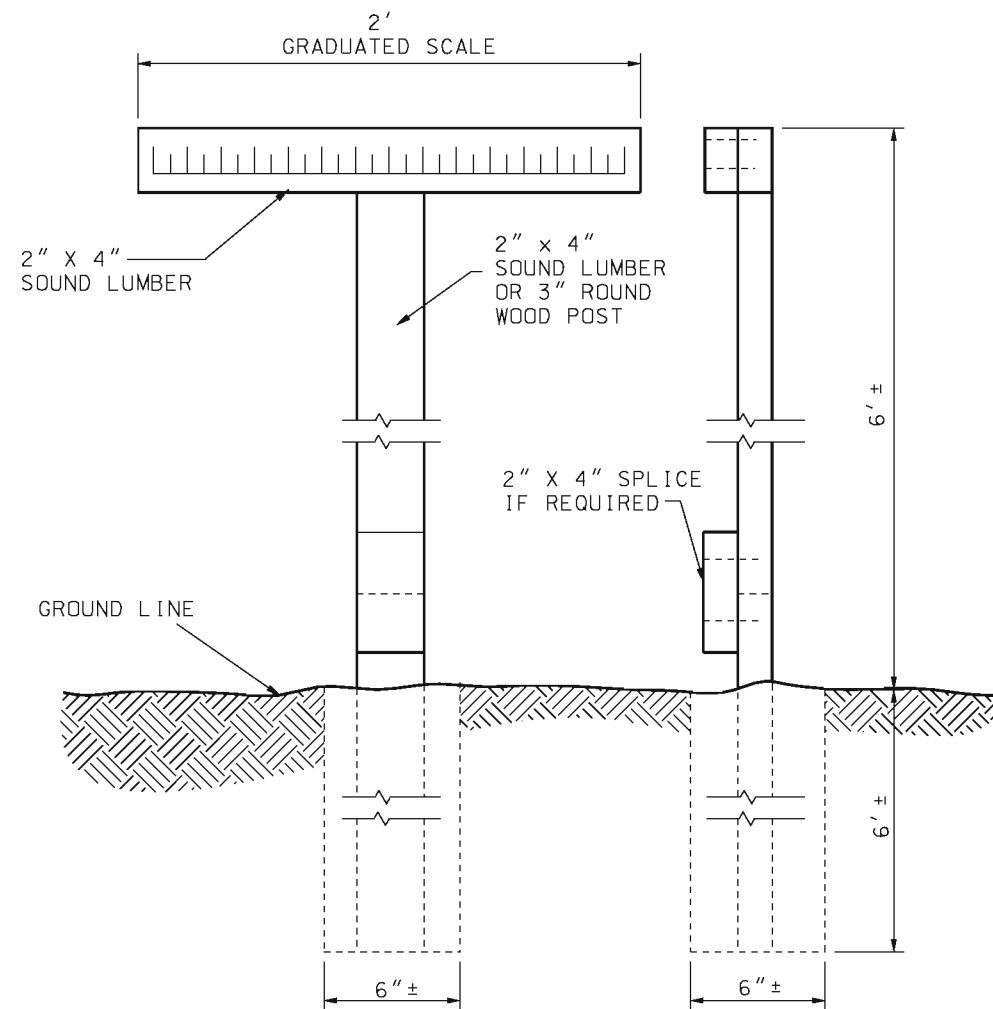
DATE PREPARED: 4/29/2020

203.65B

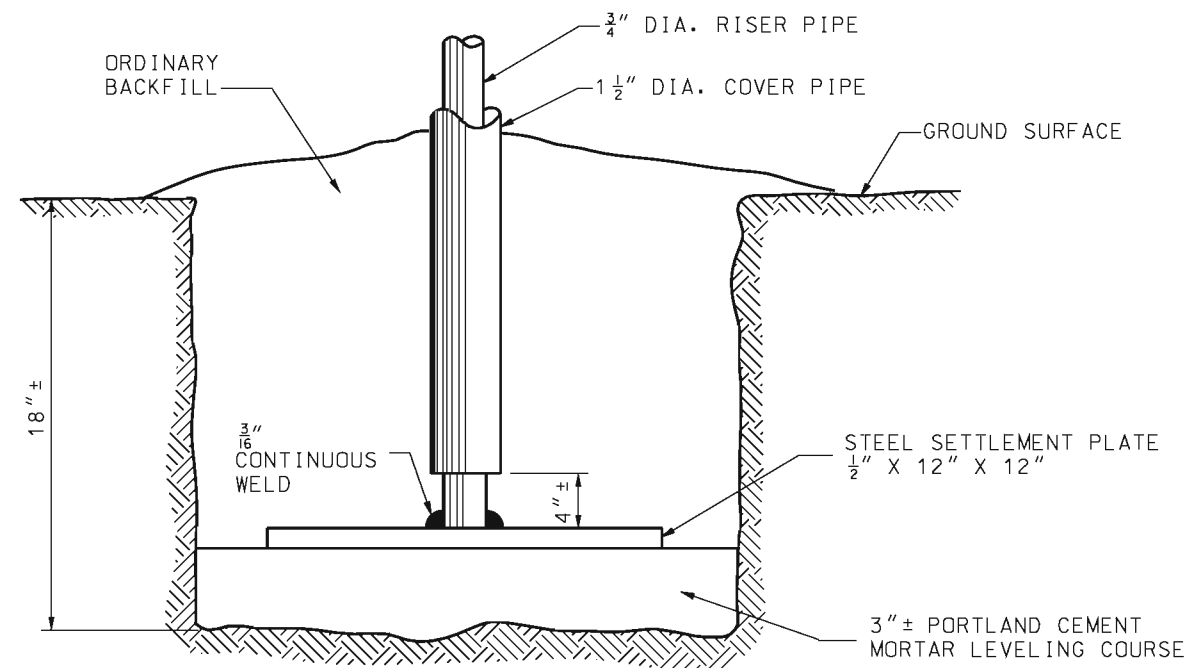
SHEET NO.

1 OF 1


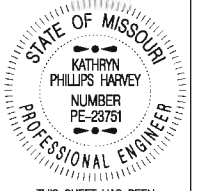
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



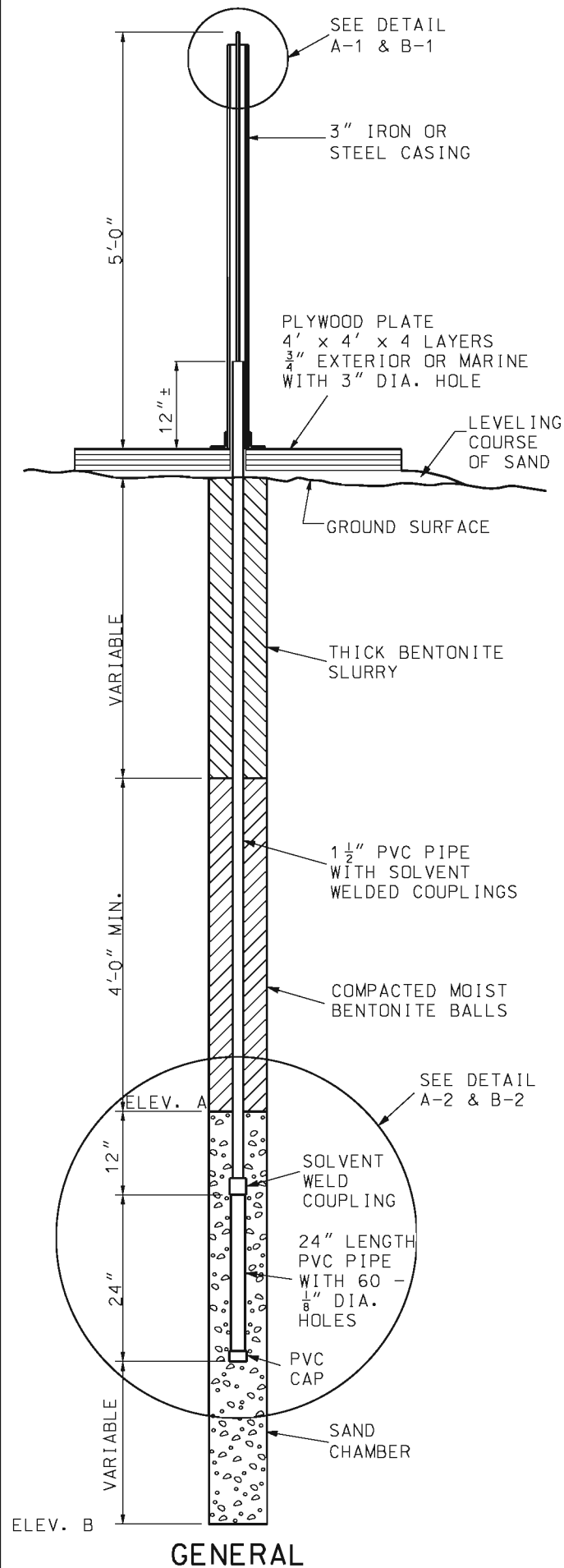
EMBANKMENT CONTROL STAKE



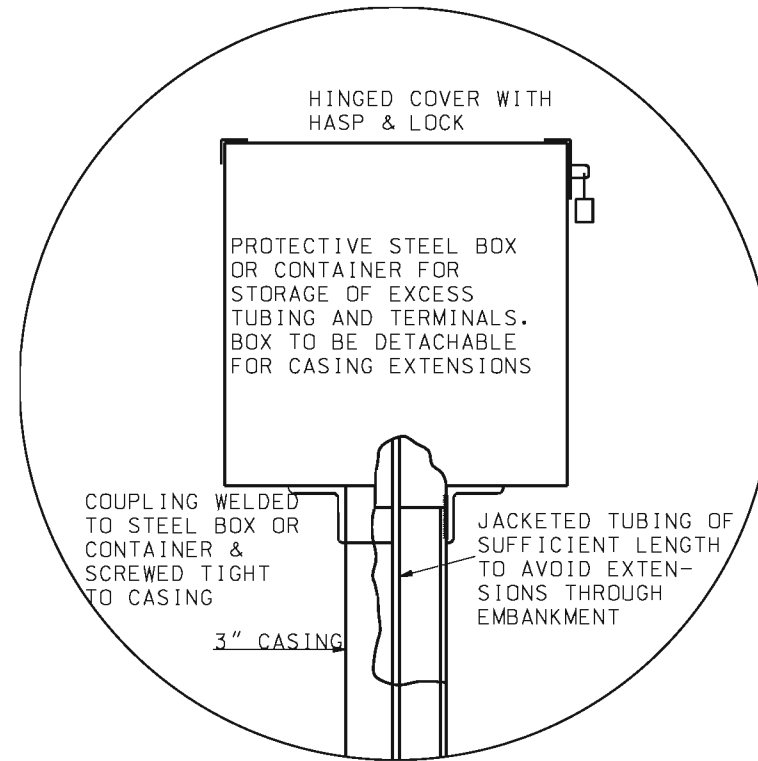
SETTLEMENT GAUGE

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | <p align="center">EMBANKMENT CONTROL MEASURING DEVICES</p> |
| DATE EFFECTIVE: 04/01/1983 DATE PREPARED: 8/21/2009 | <p align="center">204.00D</p> |
| SHEET NO. 1 OF 1 | |

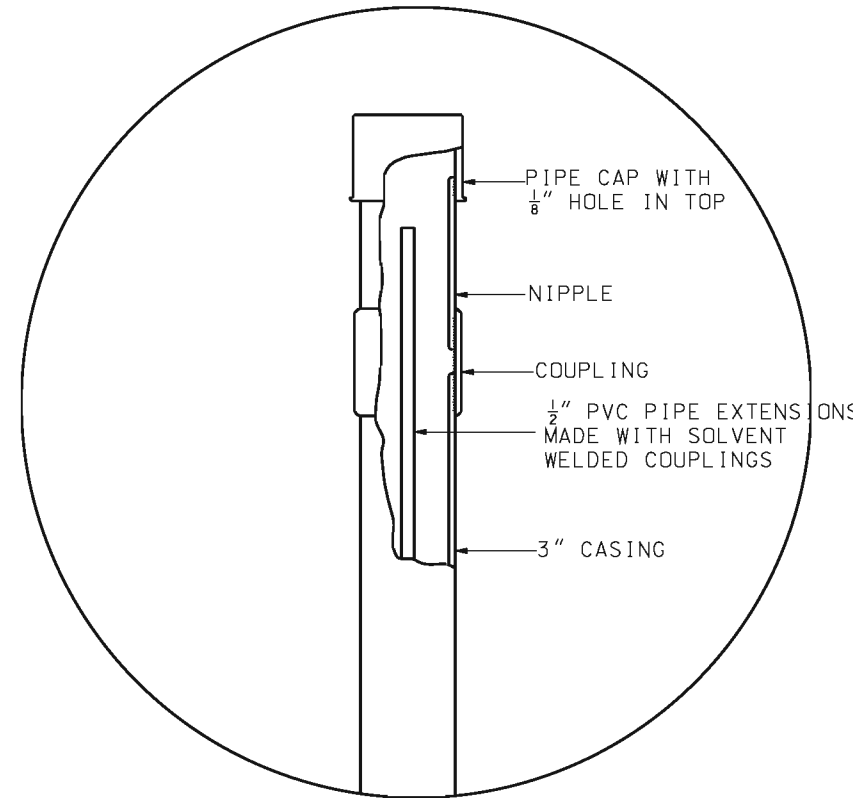
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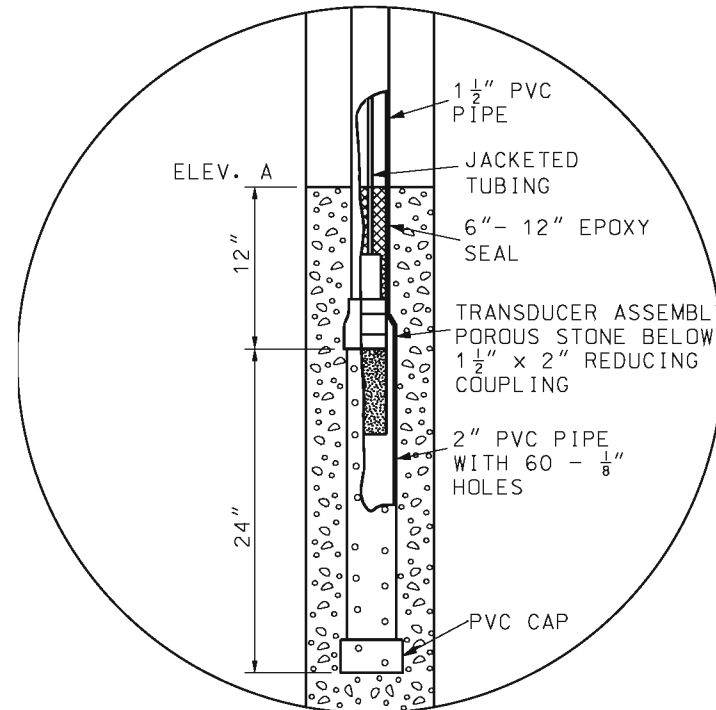
GENERAL



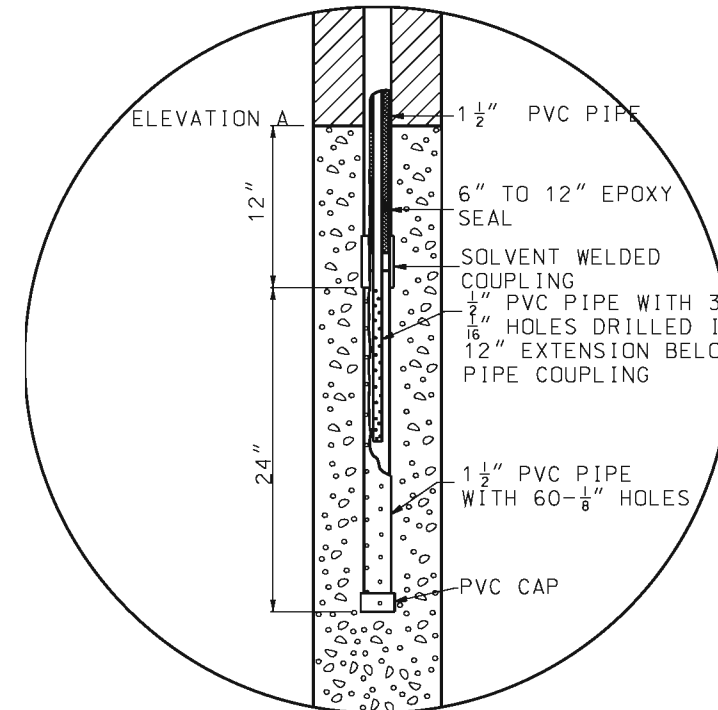
DETAIL A-1



DETAIL B-1



DETAIL A-2
TYPE A



DETAIL B-2
TYPE B

GENERAL NOTES:

FOR ELEVATION A AND ELEVATION B STATION, LOCATIONS
AND EMBANKMENT CONTROL LIMITS, SEE ROADWAY PLANS.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



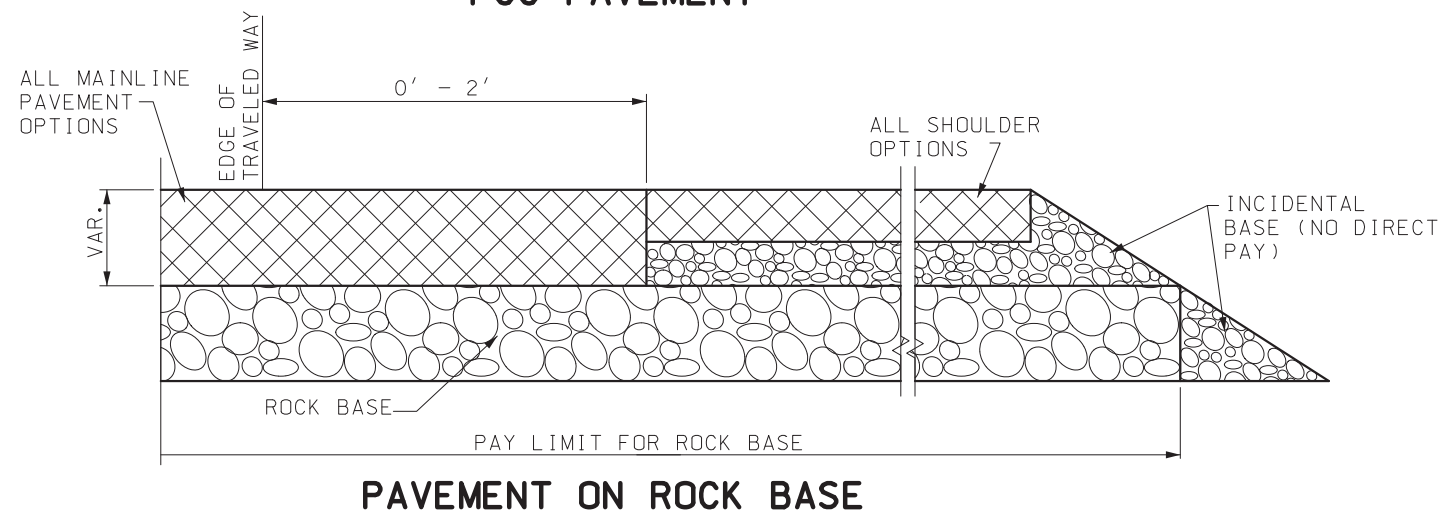
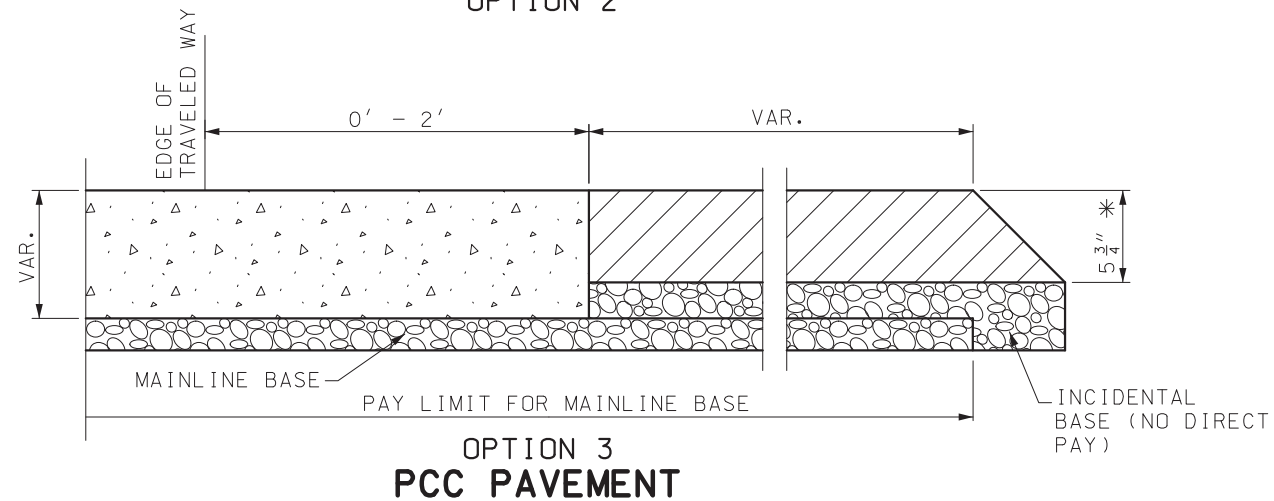
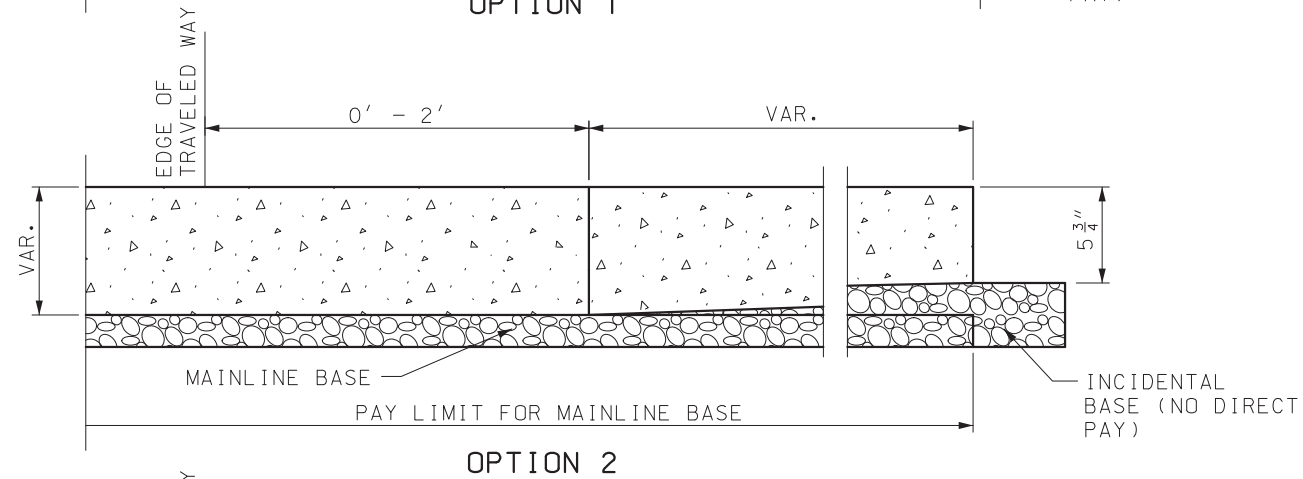
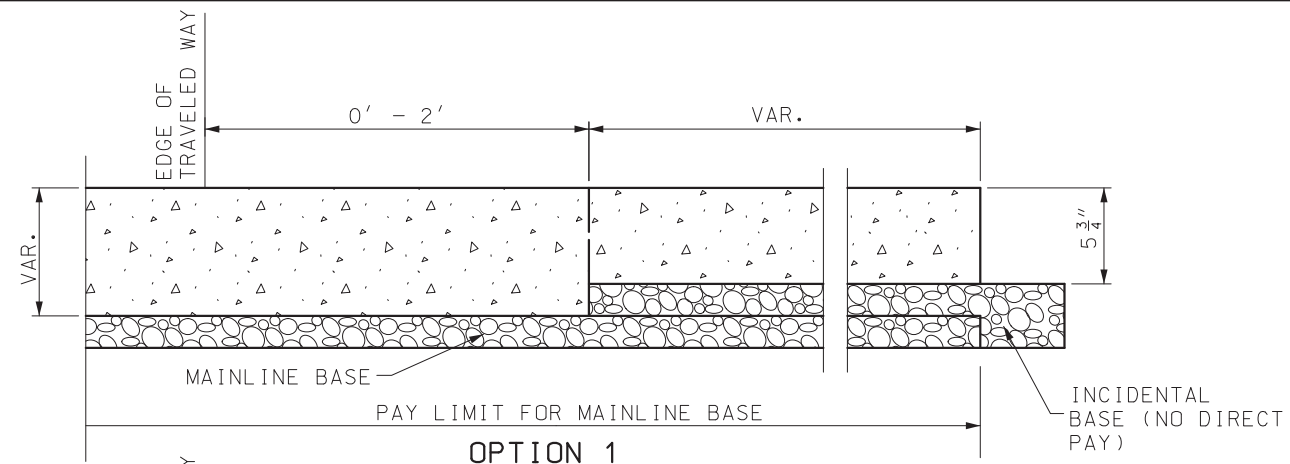
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

PORE PRESSURE
MEASUREMENT DEVICES

DATE EFFECTIVE: 03/01/1996
DATE PREPARED: 8/21/2009

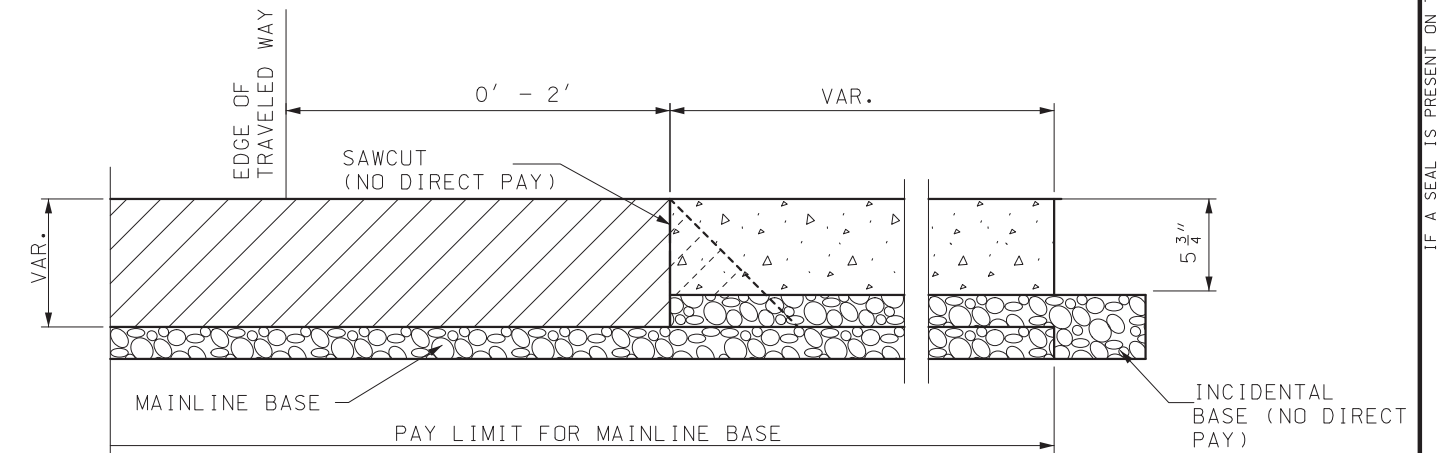
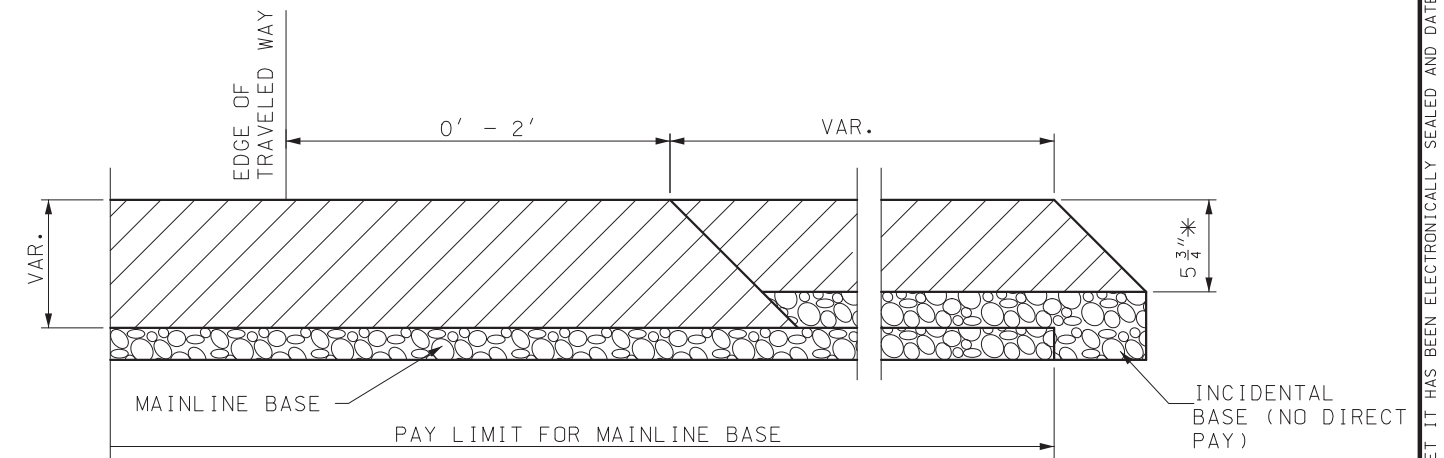
204.30

SHEET NO.
1 OF 1



RCC (ROLLER COMPACTED CONCRETE) OR
PCC (PORTLAND CEMENT CONCRETE)
HMA (HOT MIX ASPHALT)
BASE

* USE 1 3/4" BP-1 OVER 4" PMBB UNLESS OTHERWISE SPECIFIED ON THE PLANS.


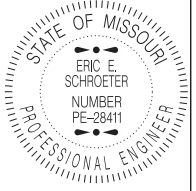


GENERAL NOTE:

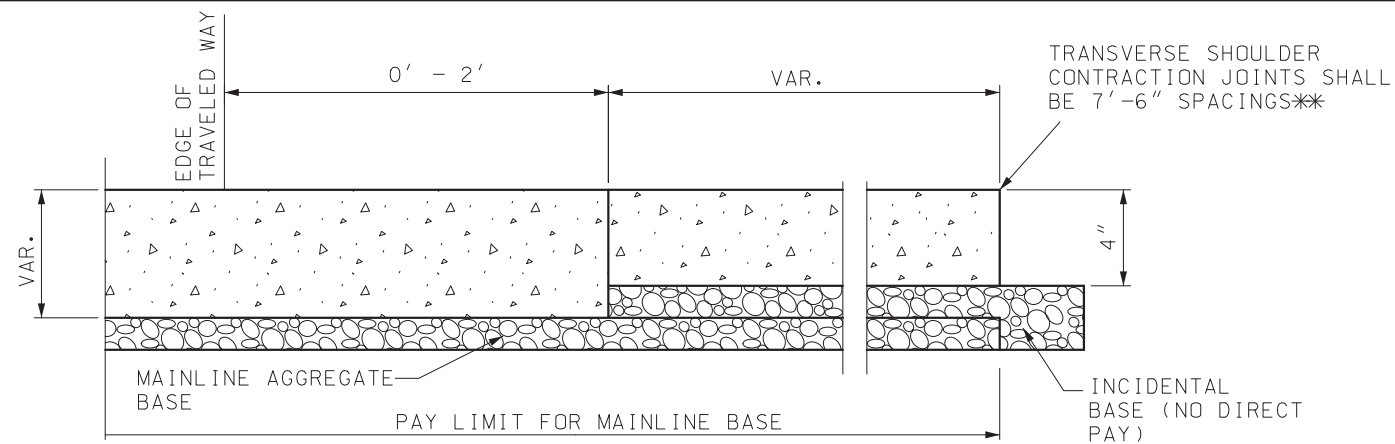
THE FINAL FINISH ON CONCRETE SHOULDERS MAY BE OBTAINED BY THE USE OF A DRAG CONSISTING OF A SEAMLESS STRIP OF DAMP BURLAP, COTTON FABRIC, PLASTIC TURF, OR OTHER SUITABLE MATERIAL CAPABLE OF PRODUCING A UNIFORM SURFACE OF GRITTY TEXTURE.

THE QUANTITY FOR ADDITIONAL BASE MATERIAL RESULTING FROM THE VARIABLE THICKNESS MATERIAL OR CONSTRUCTION METHOD OF TYPE A2 SHOULDER WILL BE CONSIDERED INCIDENTAL.

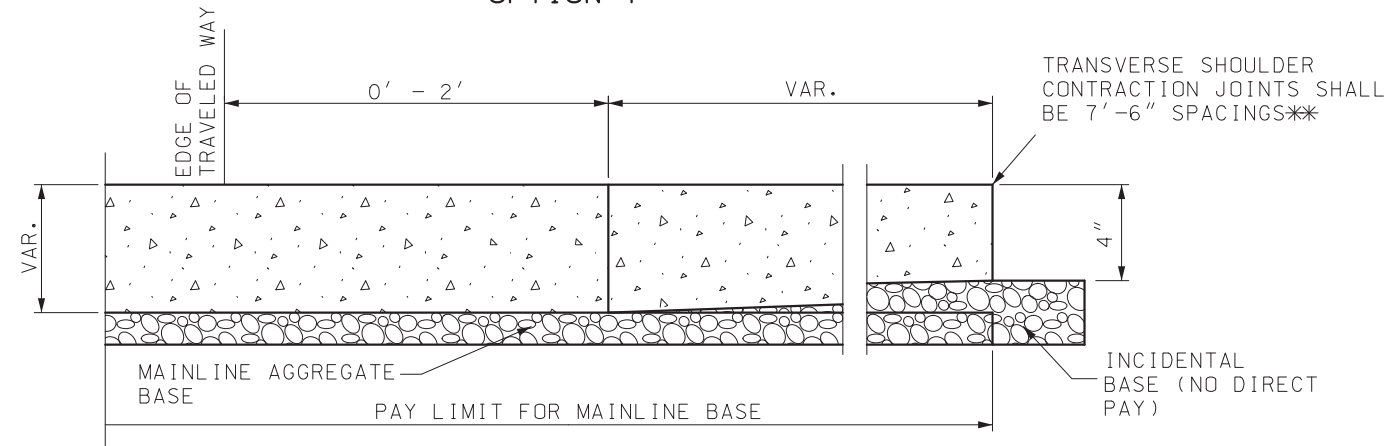
INCIDENTAL BASE SHALL CONSIST OF TYPE 1 OR 5 AGGREGATE FOR BASE, OR AN ALTERNATE MATERIAL THAT MEETS THE APPROVAL OF THE ENGINEER.

| | |
|--|--------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TYPE A2 SHOULDERS |
| DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018 | 401.00C |
| SHEET NO. 1 OF 3 | |

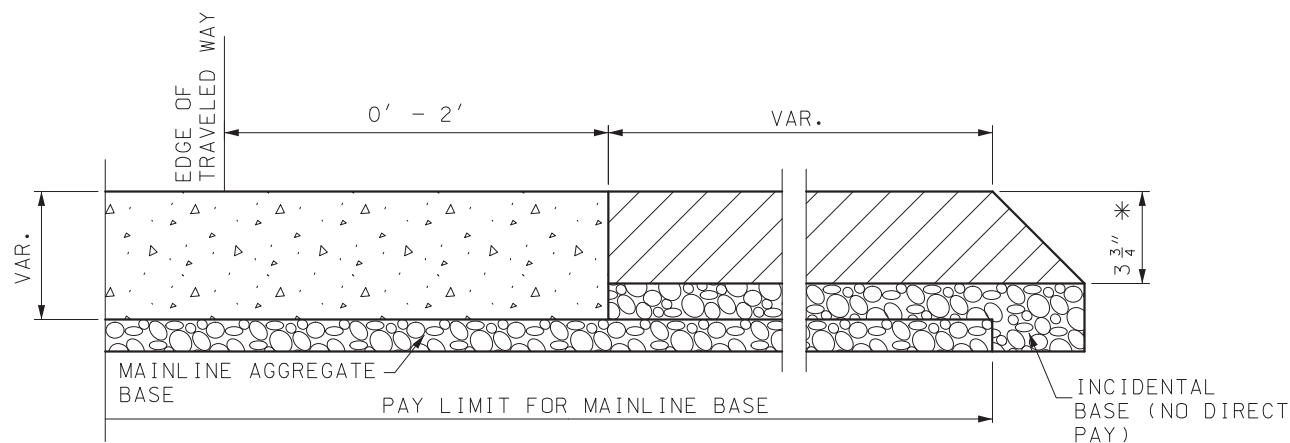
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



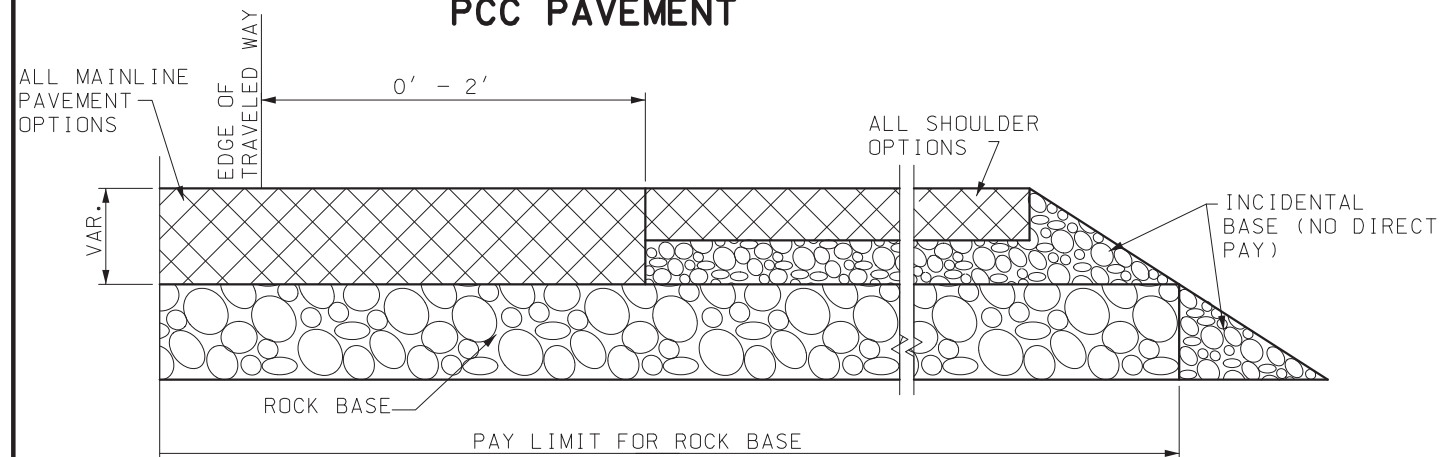
OPTION 1



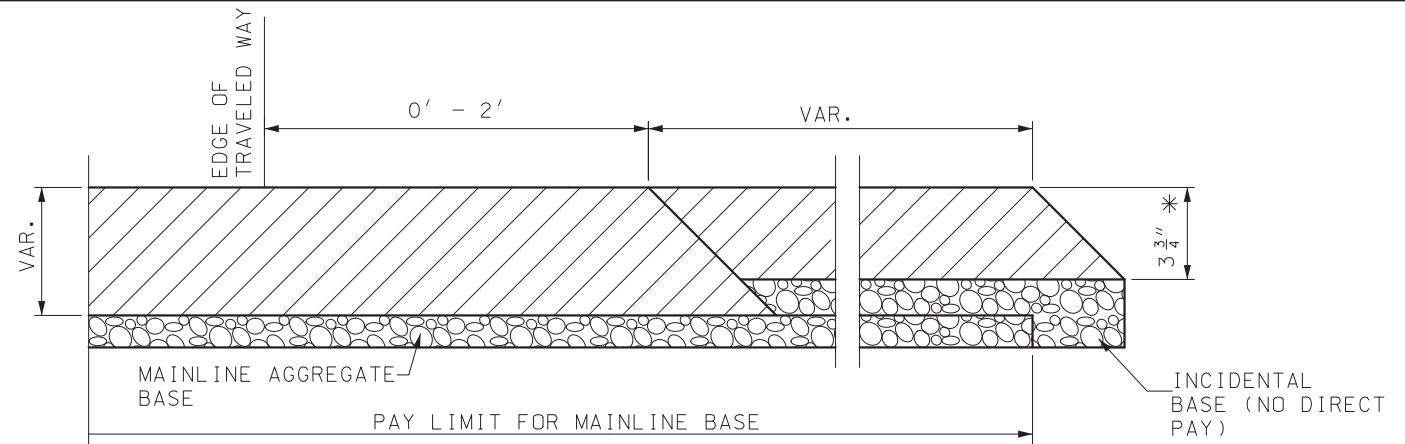
OPTION 2



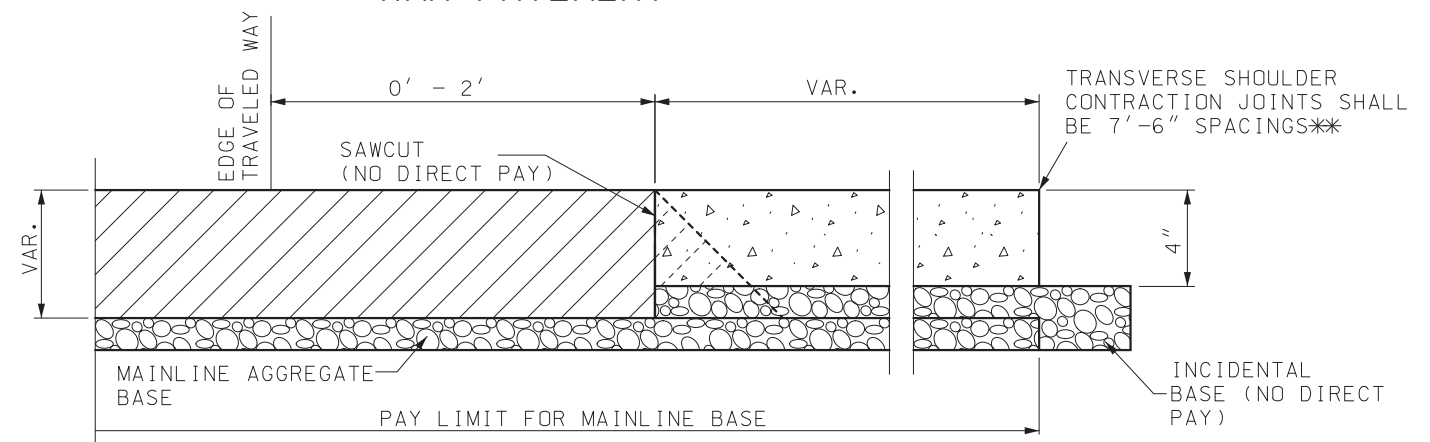
OPTION 3
PCC PAVEMENT



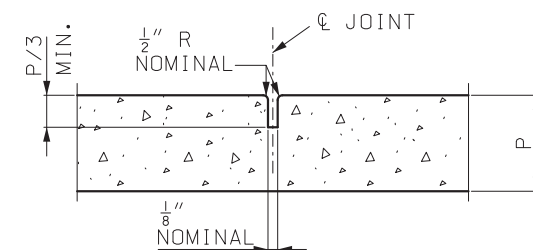
PAVEMENT ON ROCK BASE



HMA PAVEMENT

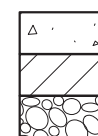


HMA PAVEMENT



TOOL JOINT

P = SHOULDER THICKNESS



RCC (ROLLER COMPACTED CONCRETE) OR
PCC (PORTLAND CEMENT CONCRETE)
HMA (HOT MIX ASPHALT)

BASE

* USE 3 3/4" BP-1 UNLESS OTHERWISE SPECIFIED ON THE PLANS.

** JOINT DEPTH SHALL BE P/3 AND MAY BE SAWED OR TOOLED.

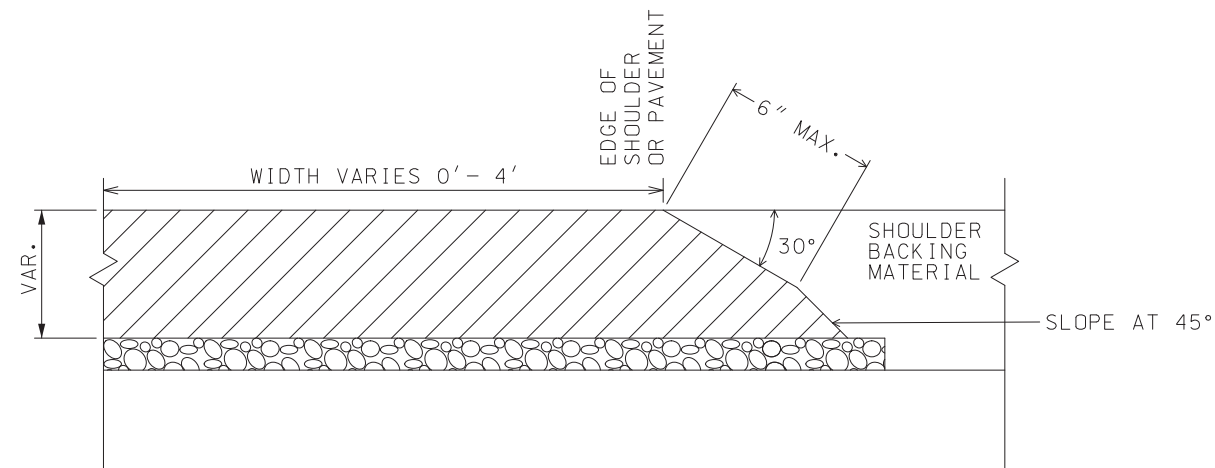
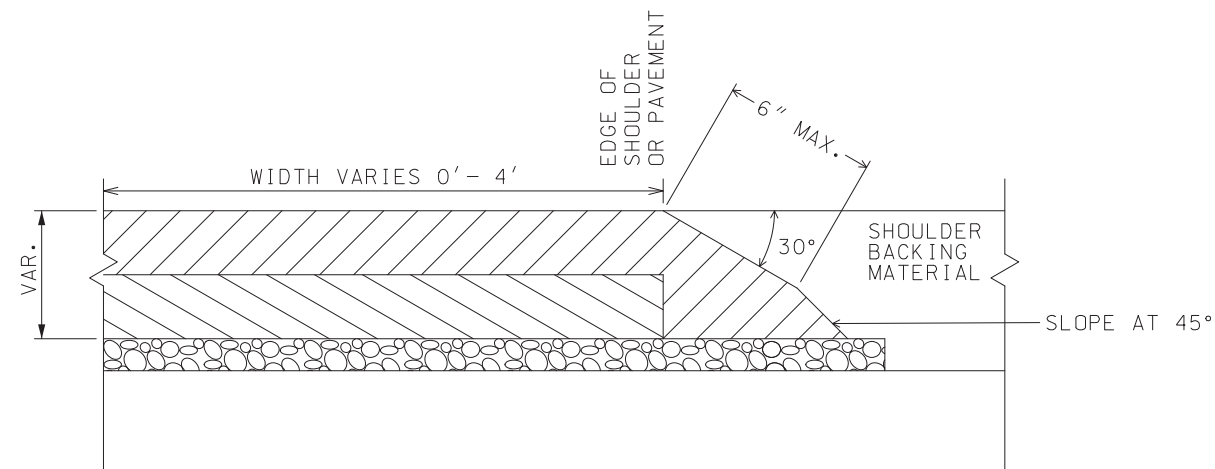
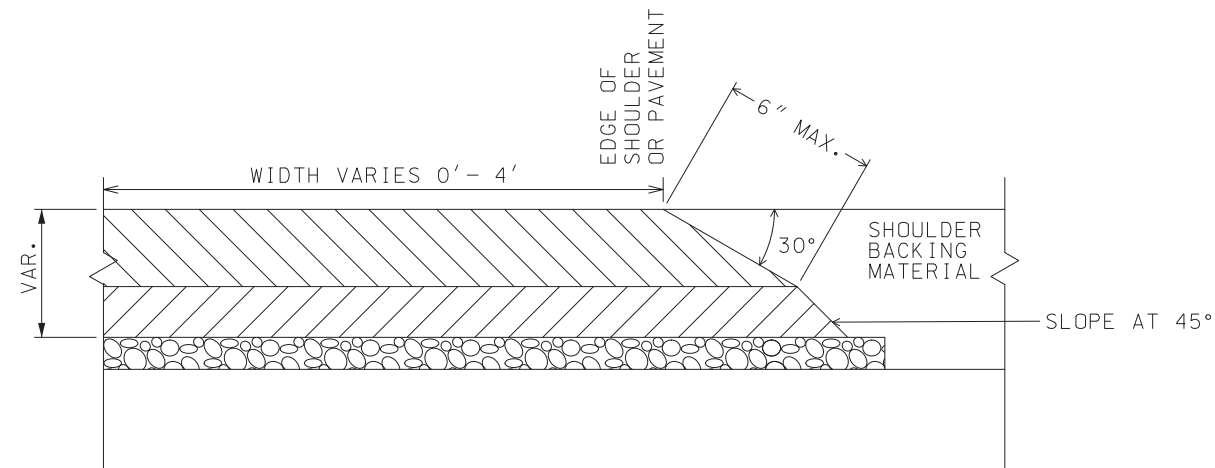
GENERAL NOTE:

THE FINAL FINISH ON CONCRETE SHOULDERS MAY BE OBTAINED BY THE USE OF A DRAG CONSISTING OF A SEAMLESS STRIP OF DAMP BURLAP, COTTON FABRIC, PLASTIC TURF OR OTHER SUITABLE MATERIAL CAPABLE OF PRODUCING A UNIFORM SURFACE OF GRITTY TEXTURE.

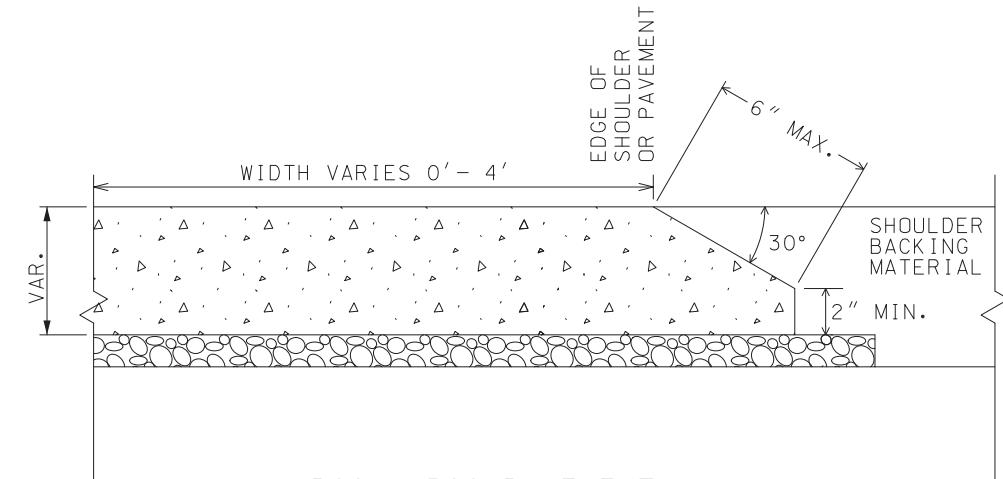
THE QUANTITY FOR ADDITIONAL BASE MATERIAL RESULTING FROM THE VARIABLE THICKNESS MATERIAL OR CONSTRUCTION METHOD OF TYPE A3 SHOULDER WILL BE CONSIDERED INCIDENTAL.

INCIDENTAL BASE SHALL CONSIST OF TYPE 1 OR 5 AGGREGATE FOR BASE, OR AN ALTERNATE MATERIAL THAT MEETS THE APPROVAL OF THE ENGINEER.




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|--|--|--|--|
| | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | | |
| | | TYPE A3 SHOULDERS | |
| DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018 | | 401.00C | |
| | | SHEET NO. 2 OF 3 | |



HMA PAVEMENT



PCC / RCC PAVEMENT

-  RCC (ROLLER COMPACTED CONCRETE) OR PCC (PORTLAND CEMENT CONCRETE)
-  HMA (HOT MIX ASPHALT)
-  BASE MATERIAL (IF APPLICABLE)

GENERAL NOTES:

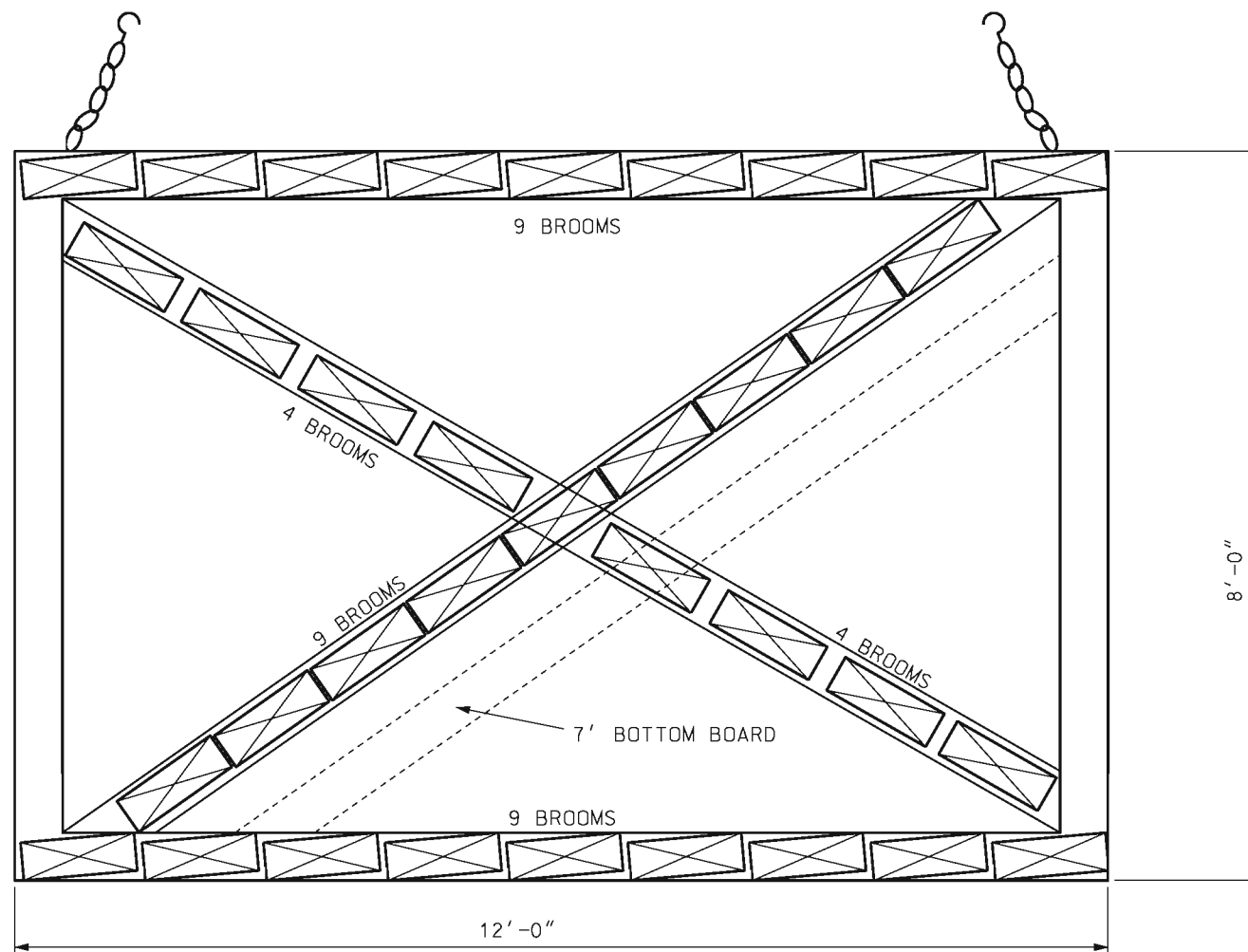
THE SAFETY EDGESM SHALL BE CONSTRUCTED AT A SLOPE OF 30° FROM THE HORIZONTAL. THE LENGTH, AS MEASURED ALONG THE SLOPE, SHALL BE APPROXIMATELY 2 TIMES THE DEPTH, UP TO A MAXIMUM LENGTH OF 6".



THE SAFETY EDGESM SHALL BE CONSTRUCTED MONOLITHICALLY WITH THE SHOULDER OR PAVEMENT.


THE SAFETY EDGESM SHALL BE BACKFILLED AS SHOWN.

REGARDLESS OF PAVEMENT TYPE, WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE PER SQUARE YARD, THE MATERIAL NECESSARY TO CONSTRUCT THE SAFETY EDGESM IS CONSIDERED INCIDENTAL TO THE PAVEMENT OR SHOULDER. NO MEASUREMENT WILL BE MADE FOR THE MATERIAL USED IN THE SAFETY EDGESM EXCEPT WHEN PAYMENT FOR PAVEMENT OR SHOULDER IS MADE IN VOLUME OR WEIGHT.

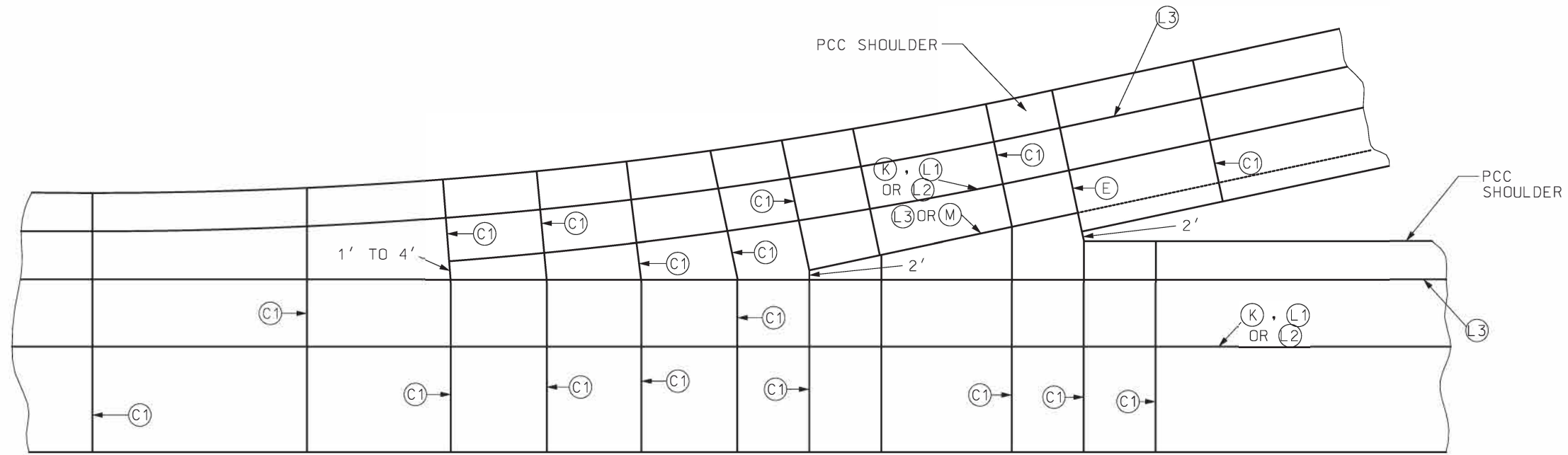
| | | | |
|---|--|--|--|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | SAFETY EDGESM | |
| DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018 | | 401.00C | |
| | | SHEET NO. 3 OF 3 | |



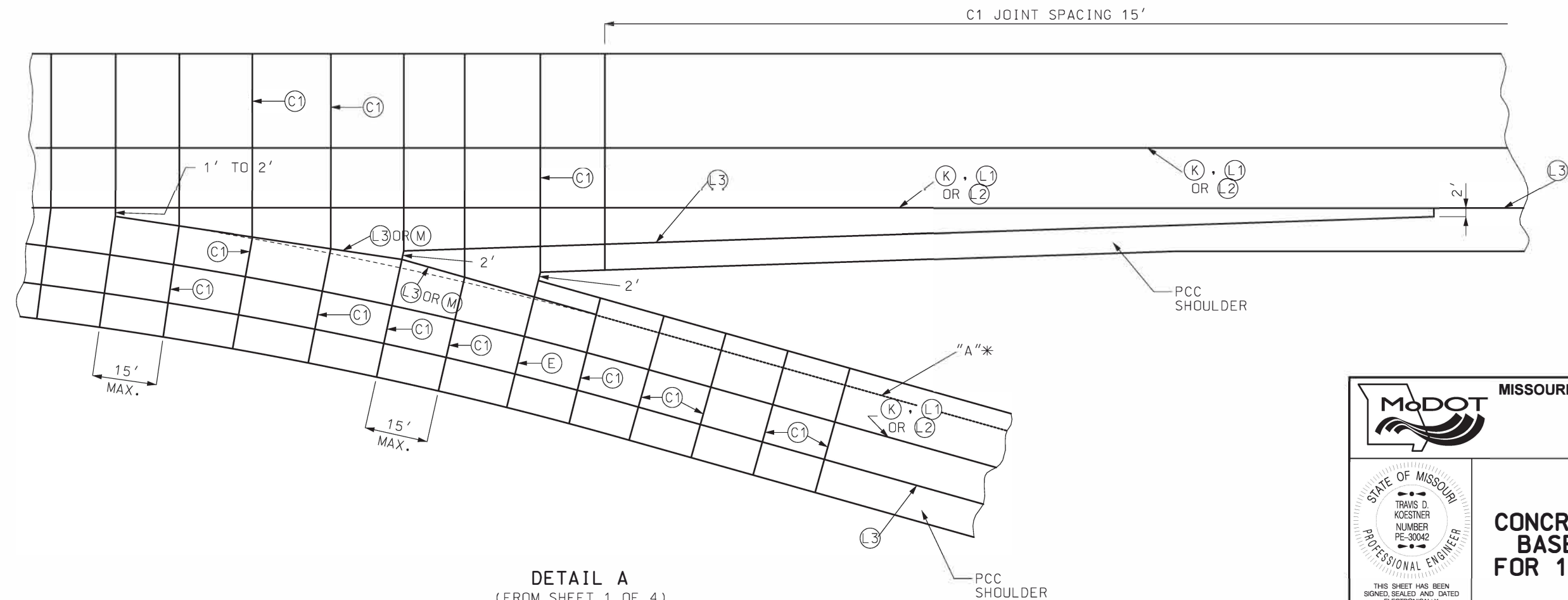
-  STREET BROOMS WITH NYLON BRISTLES
-  3/8" CHAIN WITH HOOKS

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | SCRUB SEAL BROOM CONFIGURATION |
| DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/21/2009 | 413.20 |
| SHEET NO. 1 OF 1 | |


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



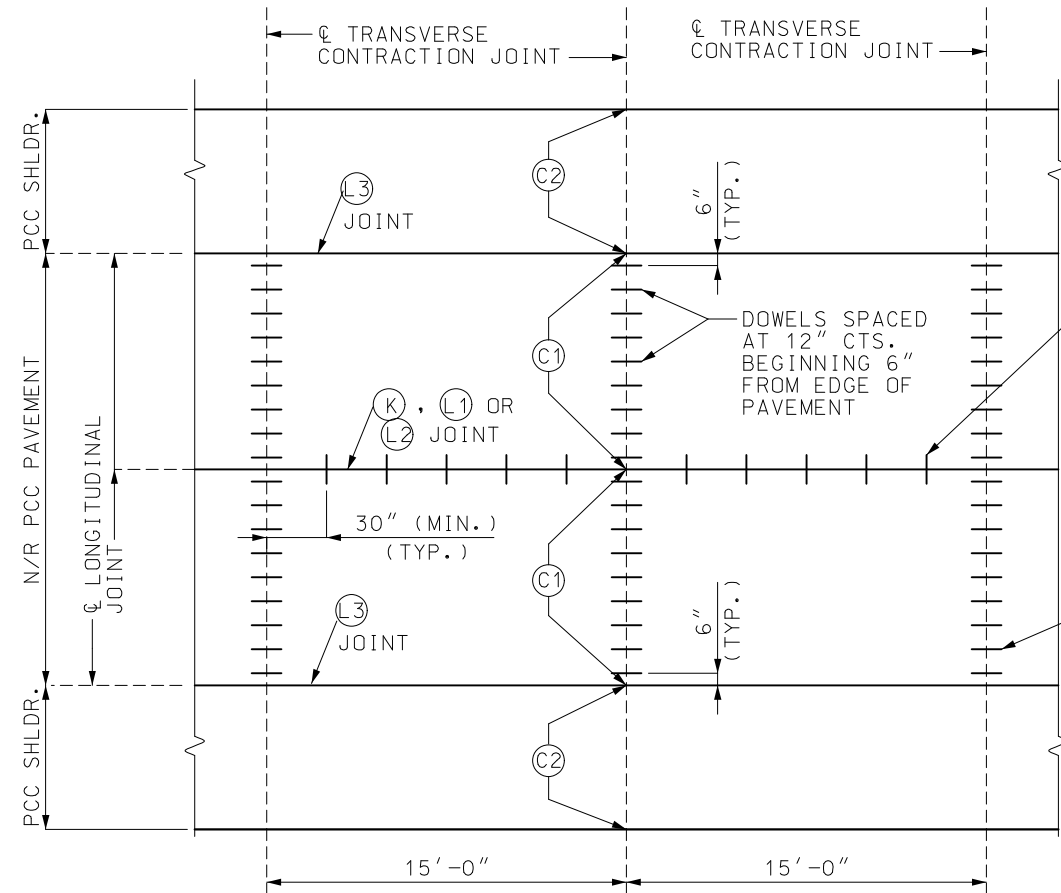
DETAIL B
(FROM SHEET 1 OF 4)



DETAIL A
(FROM SHEET 1 OF 4)

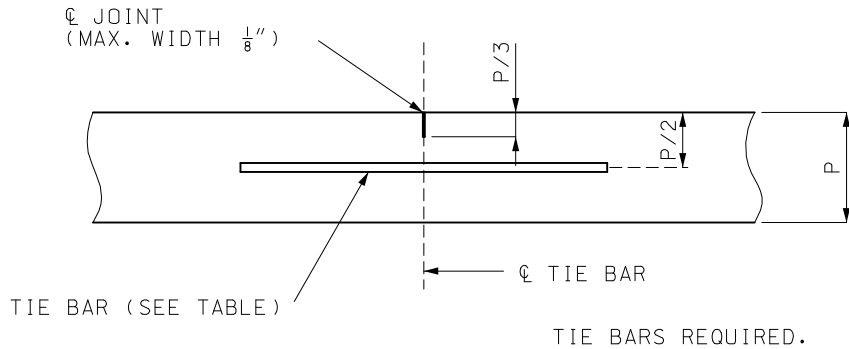
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019 | 502.05P |
| SHEET NO. 2 OF 4 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



JOINT PLAN AND SPACING FOR CONTRACTION JOINTS (1)

(1) LONGITUDINAL JOINT NOT REQUIRED AT INSIDE SHOULDER ON DIVIDED HIGHWAYS OR AT INSIDE SHOULDER OF RAMPS. FOR 4' OR LESS INSIDE SHOULDERS, DOWELS ARE REQUIRED FOR THE FIRST TWO FEET ADJACENT TO THE TRAVEL LANE.

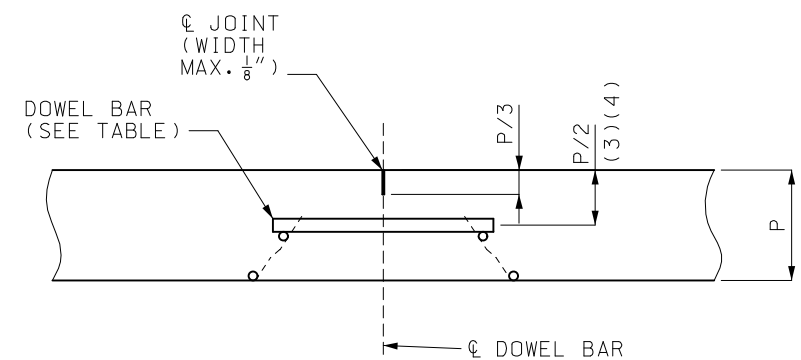


LONGITUDINAL JOINT (L1)

| TIE BAR AND DOWEL TABLE | | | | |
|-------------------------|------------|--------------|---------------|-----------------|
| PCCP THICKNESS (P) | DOWEL SIZE | TIE BAR SIZE | DOWEL SPACING | TIE BAR SPACING |
| LESS THAN 7" | NONE | #5X30" | NONE | 30" CTR.-CTR. |
| 7" TO 10" | 1 1/4"X18" | #5X30" | 12" CTR.-CTR. | 30" CTR.-CTR. |
| GREATER THAN 10" | 1 1/2"X18" | #6X40" | 12" CTR.-CTR. | 30" CTR.-CTR. |

TIE BARS SPACED AT 30" CTS. BEGINNING 30" FROM ϕ TRANSVERSE CONSTRUCTION JOINT

DOWEL BAR (TYP.)

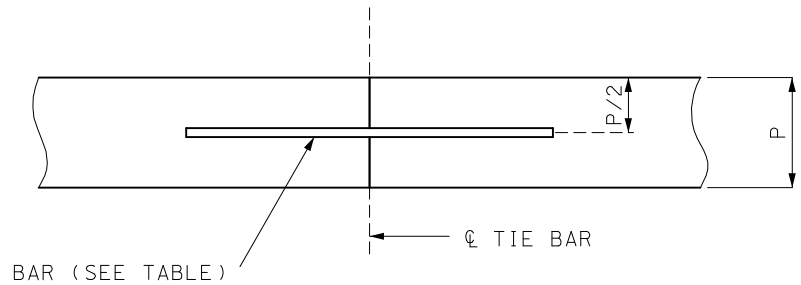


DOWELS REQUIRED. FOR PERMISSIBLE TYPES OF DOWELS SUPPORTING UNITS, SEE OTHER DRAWINGS.

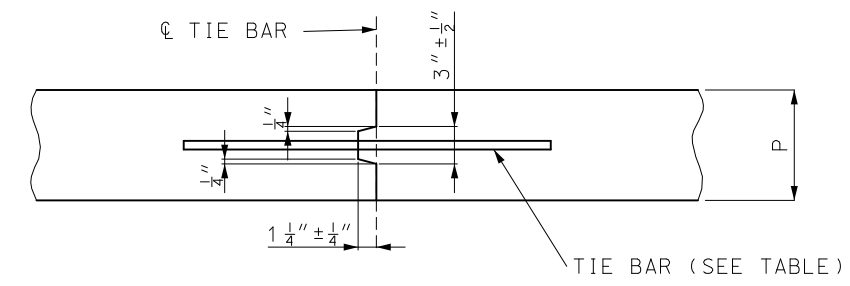
TRANSVERSE CONTRACTION JOINTS FOR CONCRETE PAVEMENT OR BASE WIDENING SHALL MATCH EXISTING JOINTS.

TRANSVERSE CONTRACTION JOINT (C2) (2)

- (2) DOWEL BARS ARE REQUIRED FOR ALL PAVEMENTS HAVING THE SAME THICKNESS AS THE TRAVELED WAY.
- (3) FOR PAVEMENTS HAVING THICKNESS IN 1/2" INCREMENTS, DOWEL BASKETS SHALL BE P/2 - 1/2".
- (4) DOWEL BARS MAY BE PLACED BY MECHANICAL MEANS AT THE OPTION OF THE CONTRACTOR.



LONGITUDINAL CONSTRUCTION JOINT (L2)



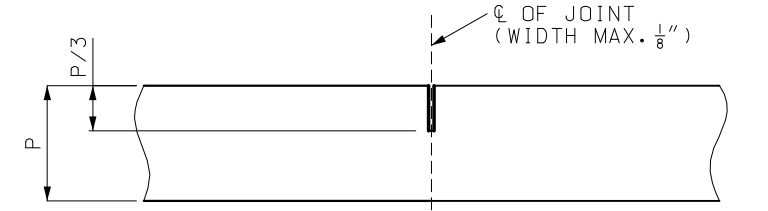
IF METAL IS USED TO FORM KEY DISCONTINUE STRIP FOR DISTANCE OF APPROXIMATELY 3" EACH SIDE OF TRANSVERSE JOINT.

TYPE (K) REQUIRES TIE BAR.

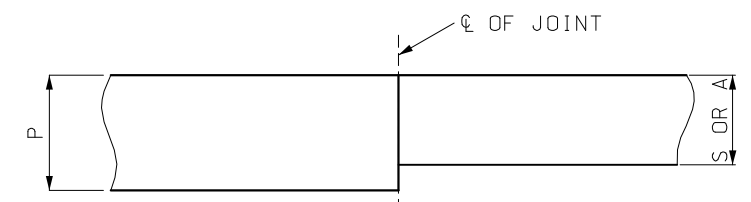
TYPE (M) CONSTRUCTED WITHOUT TIE BARS.

(K) AND (M) JOINTS SHALL NOT BE SAWED.

TONGUE AND GROOVE JOINTS (K) AND (M)



TRANSVERSE CONTRACTION JOINT (C2)



LONGITUDINAL CONSTRUCTION JOINT FOR SHOULDER AND APPROACHES (L3)

S = SHOULDER THICKNESS
A = APPROACH THICKNESS

GENERAL NOTES:

THE FINAL POSITION OF ALL DOWELS AND TIE BARS SHALL BE PERPENDICULAR TO THE PLANE OF THE JOINT AND PARALLEL TO THE SURFACE OF THE PAVEMENT AND PARALLEL TO EACH OTHER.

(L3) JOINT FOR FULL DEPTH OR PARTIAL DEPTH SHOULDERS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

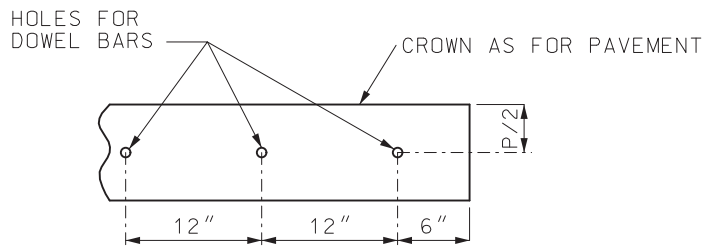
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING

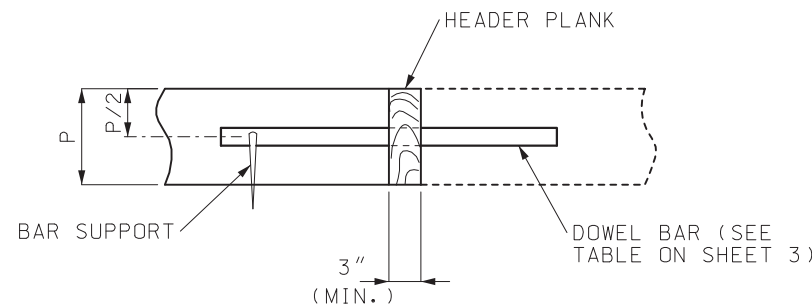
STATE OF MISSOURI
TRAVIS D. KOESTNER
NUMBER PE-30042
PROFESSIONAL ENGINEER

DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

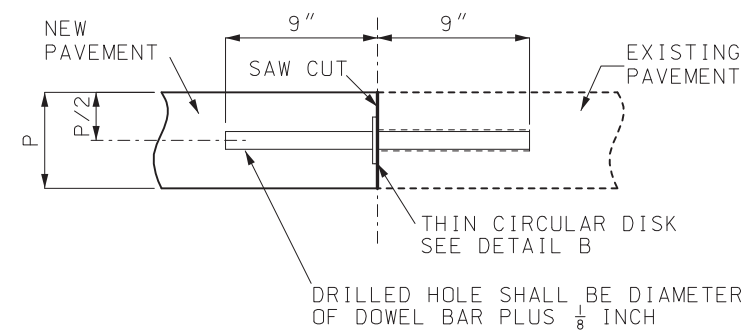
SHEET NO.
3 OF 4



PART ELEVATION OF
HEADER PLANK



HEADER SECTION



SAWED SECTION

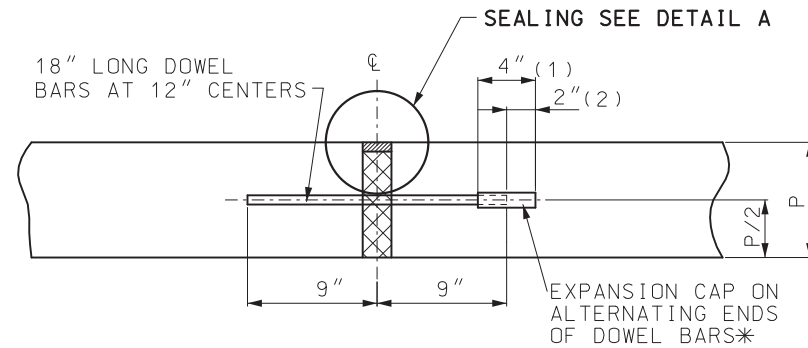
THE HEADER BOARD SHALL BE SUFFICIENTLY RIGID TO PREVENT DISTORTION FROM THE TYPICAL SECTION AND MAINTAIN A STRAIGHT LINE FROM PAVEMENT EDGE TO PAVEMENT EDGE.

THE CONSTRUCTION JOINT MAY BE SAWED FULL DEPTH. HOLES FOR DOWEL BARS SHALL BE DRILLED AFTER THE CONCRETE HAS SUFFICIENT SET TO PREVENT DAMAGE. DOWEL BARS SHALL BE BONDED INTO THE HOLES.

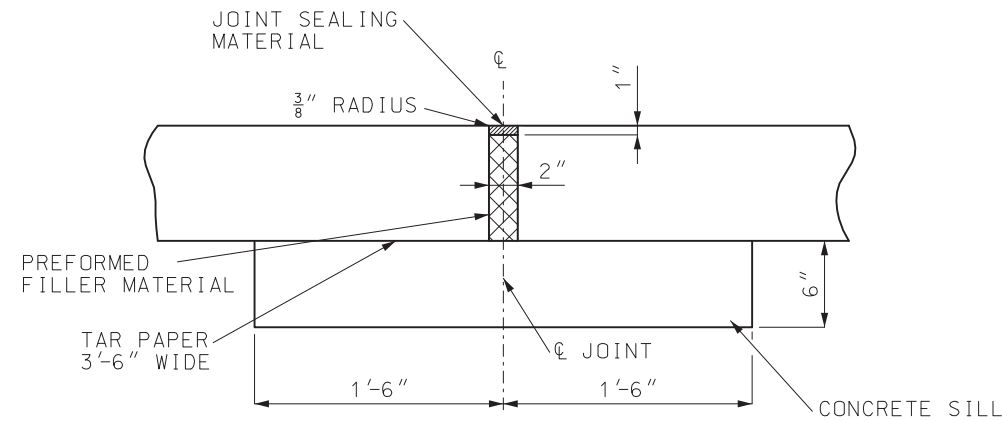
BONDING FOR DOWEL BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

THE PORTION OF THE DOWEL OUTSIDE THE HOLE SHALL BE COATED WITH AN APPROVED LUBRICANT.

CONSTRUCTION JOINT (C)



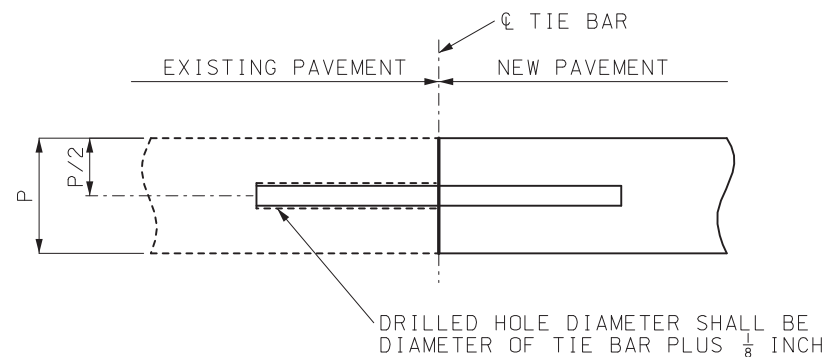
EXPANSION JOINTS (E)



SILL SHALL EXTEND 18" BEYOND EACH EDGE OF THE PAVEMENT AND SHALL BE CONSTRUCTED OF CONCRETE REGARDLESS OF ADJACENT BASE MATERIAL.

ALTERNATE EXPANSION JOINTS (E)

(CONTRACTOR MAY SELECT EITHER EXPANSION JOINT (E))



TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTIONS 710 AND 1057.

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

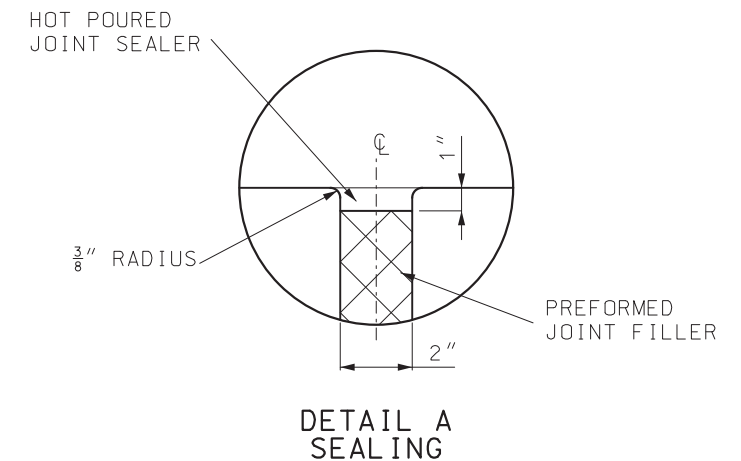
TIE BAR SIZE AND LENGTH SHALL BE BASED ON THE THICKNESS OF THE THINNER PAVEMENT OR SHOULDER TO BE TIED TOGETHER.

LONGITUDINAL CONSTRUCTION JOINT (EXISTING PAVEMENT) (L)

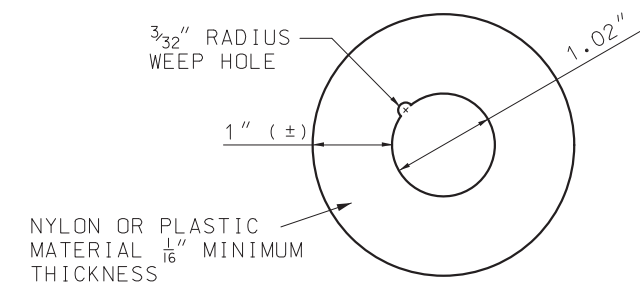
(1) LENGTH OF CAP

(2) GAP BETWEEN END OF CAP AND DOWEL.


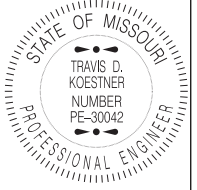
* FOR EXPANSION JOINTS FORMED USING A CONSTRUCTION HEADER, THE EXPANSION CAPS SHALL BE INSTALLED ON THE EXPOSED END OF EACH BAR ONCE THE HEADER HAS BEEN REMOVED AND THE JOINT FILLER MATERIAL HAS BEEN INSTALLED.

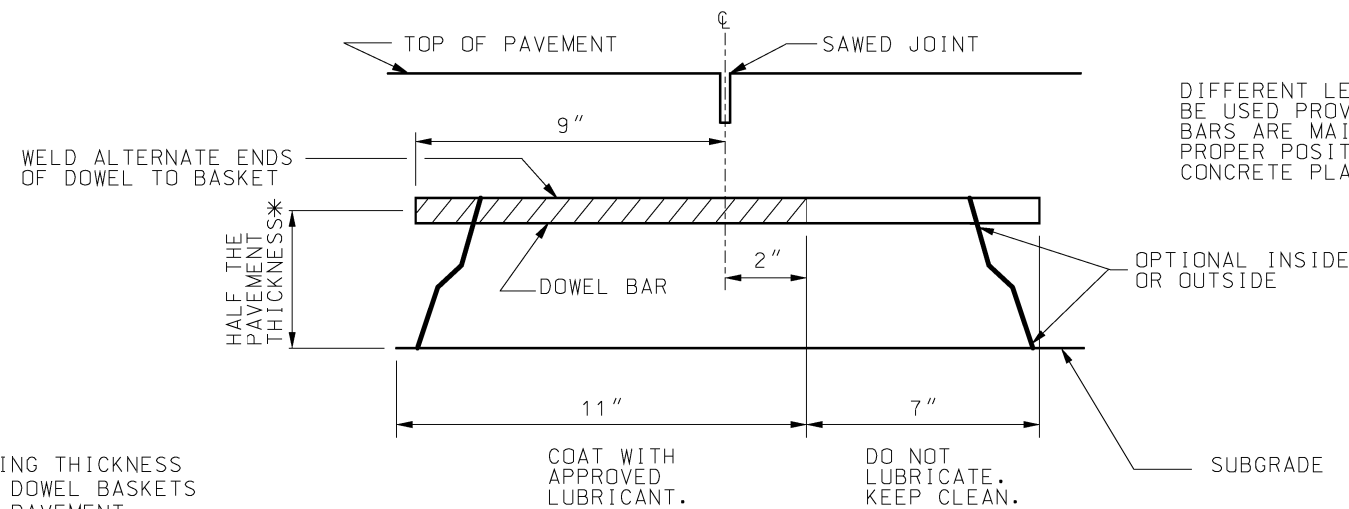


DETAIL A
SEALING



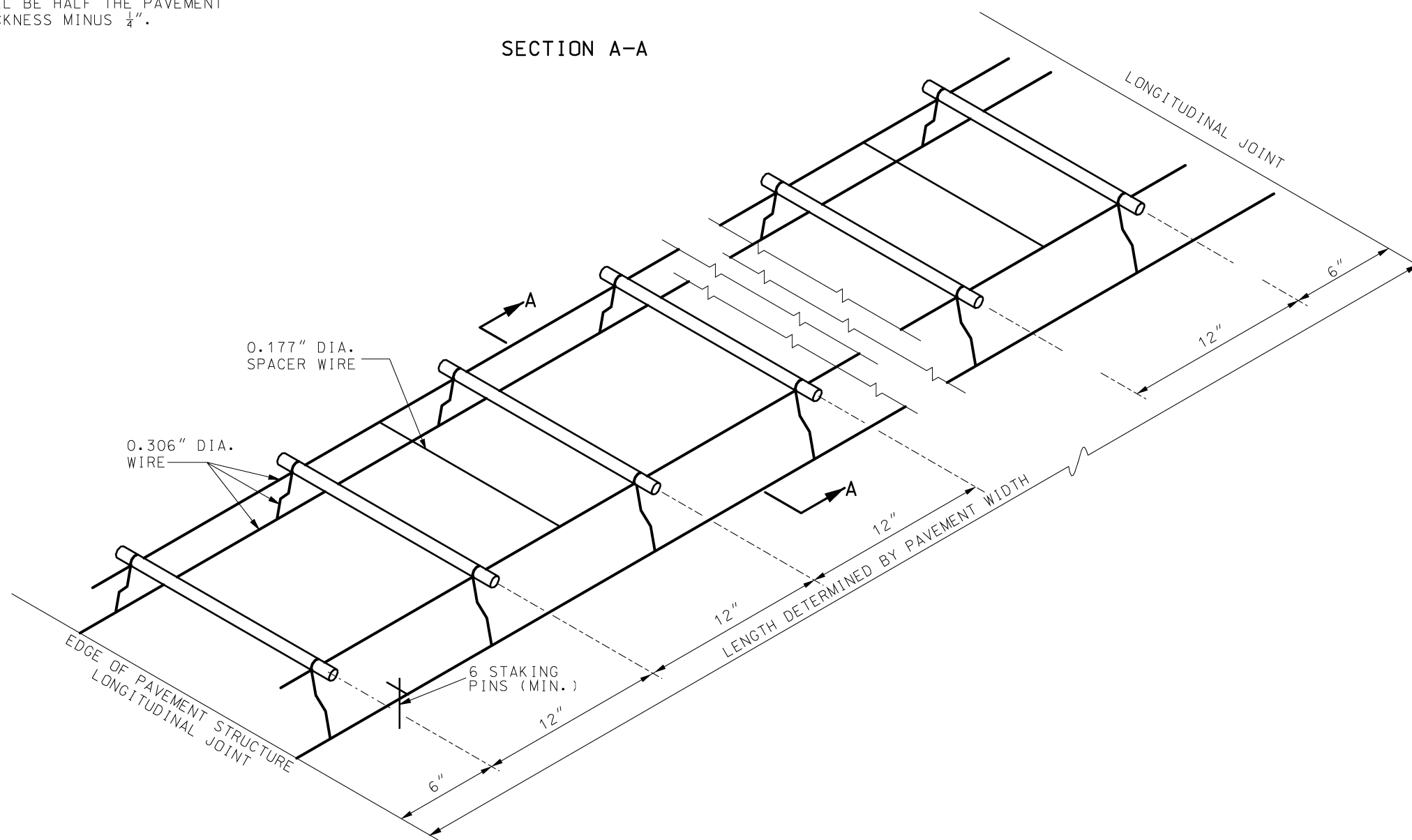
DETAIL B
THIN CIRCULAR DISK

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15' JOINT SPACING |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019 | 502.05P |
| SHEET NO. 4 OF 4 | |



* FOR PAVEMENTS HAVING THICKNESS IN $\frac{1}{2}$ " INCREMENTS, DOWEL BASKETS SHALL BE HALF THE PAVEMENT THICKNESS MINUS $\frac{1}{4}$ ".

SECTION A-A



| DOWEL BARS | | |
|--------------------|-------------------|--------|
| PAVEMENT THICKNESS | BAR SIZE | |
| | DIAMETER | LENGTH |
| 10" AND LESS | 1 $\frac{1}{4}$ " | 18" |
| GREATER THAN 10" | 1 $\frac{1}{2}$ " | 18" |

GENERAL NOTES:

THE DOWEL SUPPORTING UNITS SHALL BE FACTORY ASSEMBLED AND CAPABLE OF HOLDING THE DOWELS IN THEIR REQUIRED POSITIONS. IN THE COMPLETED JOINT INSTALLATION, DOWELS SHALL BE POSITIONED WITHIN $\frac{1}{2}$ " OF THE VERTICAL AND HORIZONTAL PLANE AND IN THE LONGITUDINAL DIRECTION. THE SKEW TOLERANCE SHALL BE $\frac{1}{4}$ ".

THE FREE END OF EACH EPOXY COATED DOWEL SHALL BE MARKED WITH A SPOT OF PAINT AT LEAST ONE INCH IN DIAMETER AND CONTRASTING IN COLOR WITH THE EPOXY COATING.

WIRE SIZES SHOWN ARE MINIMUM REQUIRED.

WIRES, BARS OR CLIPS SHALL BE USED AS NECESSARY TO STRENGTHEN THE ASSEMBLIES.

THE DIAMETER OF THE SPACER WIRE SHALL NOT EXCEED 0.200".

SPACER WIRE MAY BE CUT OR LEFT INTACT.

STAKING PINS SHALL BE FABRICATED FROM 0.306" DIAMETER WIRE MINIMUM WITH A SUITABLE HOOK. STAKING PINS SHALL HAVE A MINIMUM LENGTH OF 12" FOR DOWEL ASSEMBLIES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

MINOR VARIATIONS IN THE CONFIGURATION OF THE SUPPORT UNITS WILL BE ALLOWED.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

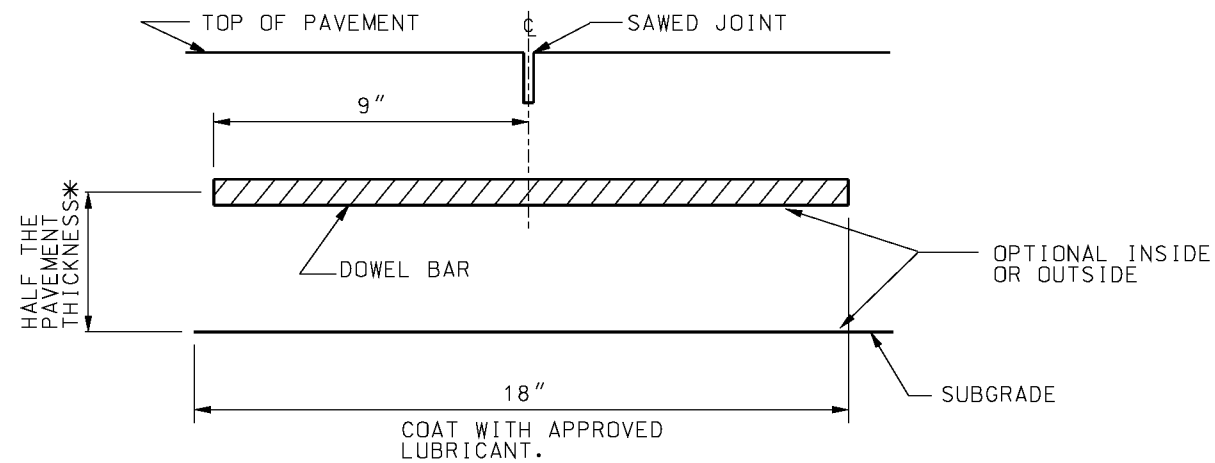
DOWEL SUPPORTING UNITS

APPROVED FOR USE
WITH TRANSVERSE JOINTS

DATE EFFECTIVE: 06/01/2010
DATE PREPARED: 10/30/2015

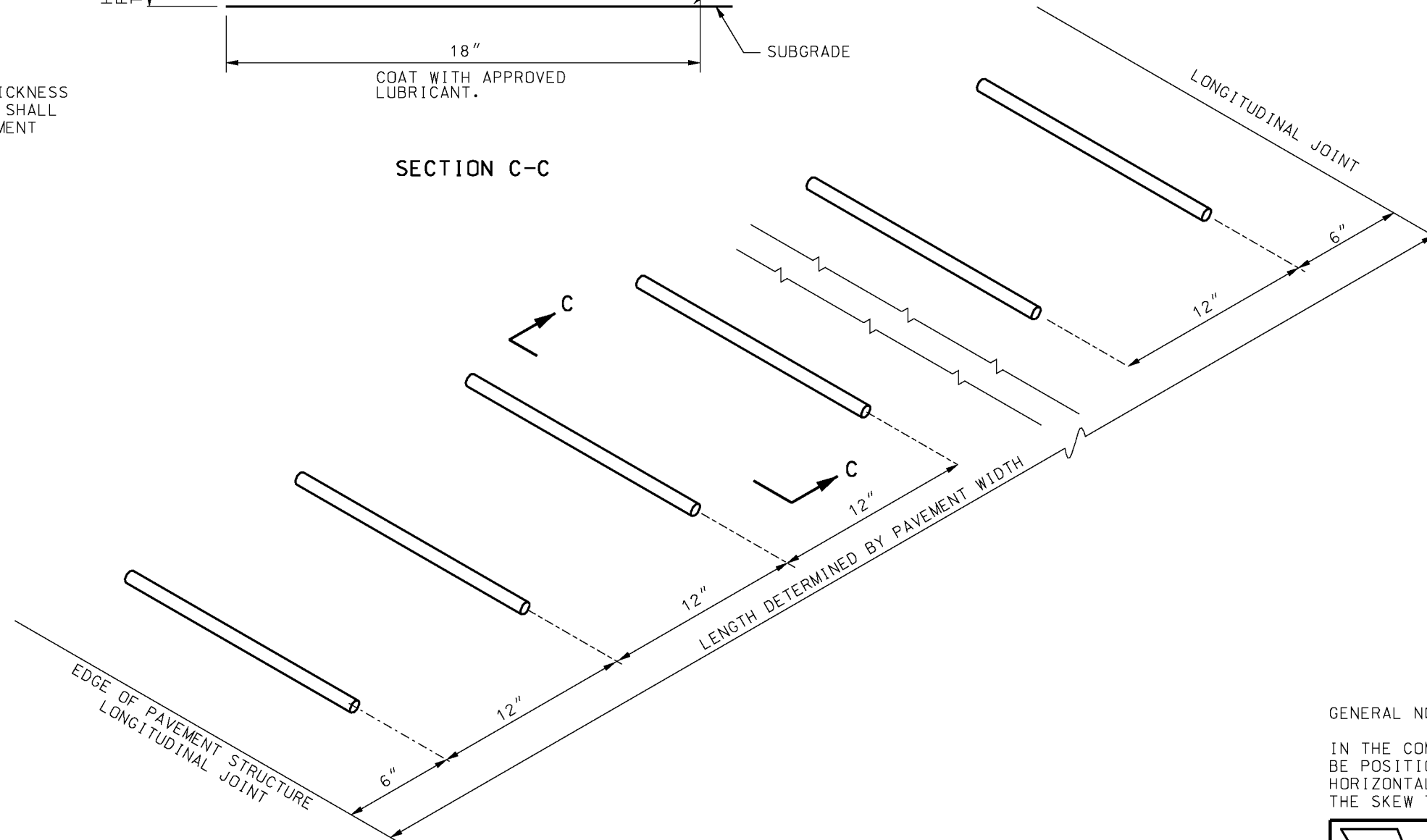
502.10K

SHEET NO.
1 OF 2





* FOR PAVEMENTS HAVING THICKNESS IN $\frac{1}{2}$ " INCREMENTS, DOWEL SHALL BE PLACED HALF THE PAVEMENT THICKNESS MINUS $\frac{1}{4}$ ".

SECTION C-C




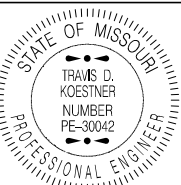
GENERAL NOTES:

IN THE COMPLETED JOINT INSTALLATION, DOWELS SHALL BE POSITIONED WITHIN $\frac{1}{2}$ " OF THE VERTICAL AND HORIZONTAL PLANE AND IN THE LONGITUDINAL DIRECTION. THE SKEW TOLERANCE SHALL BE $\frac{1}{4}$ ".

| | | |
|--|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <small>THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY.</small> | DOWEL SUPPORTING UNITS MECHANICAL PLACEMENT | |
| | DATE EFFECTIVE: 06/01/2010 DATE PREPARED: 5/29/2015 | 502.10K |

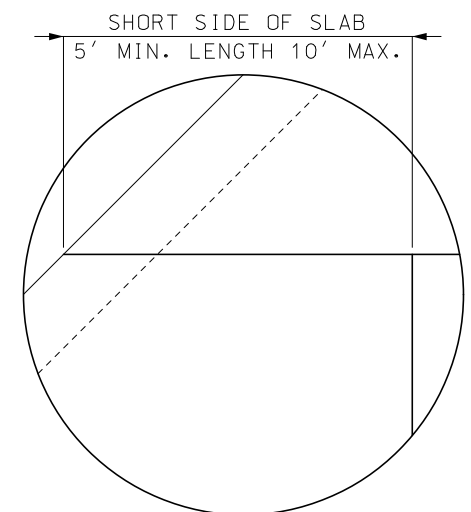


FOR SECTIONS A-A, B-B AND
C-C, SEE SHEET 3 OF 3.

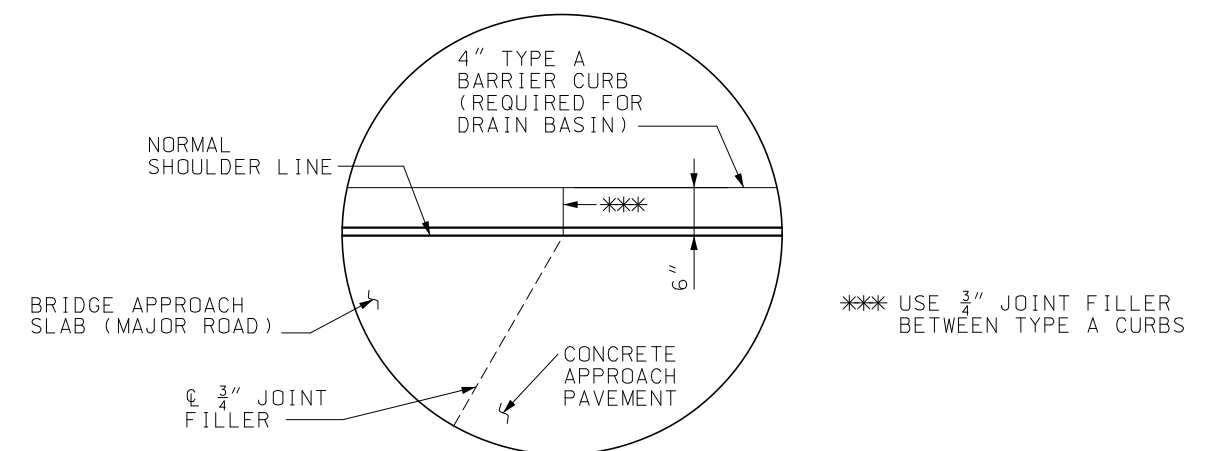
| | | | |
|---|---|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p align="center"> CONCRETE APPROACH PAVEMENT FOR TWO-LANE PAVEMENTS (MAJOR ROAD) </p> | | |
| DATE EFFECTIVE: <u>10/01/2020</u> DATE PREPARED: <u>7/21/2020</u> | 504.00K | | SHEET NO. 1 OF 3 |



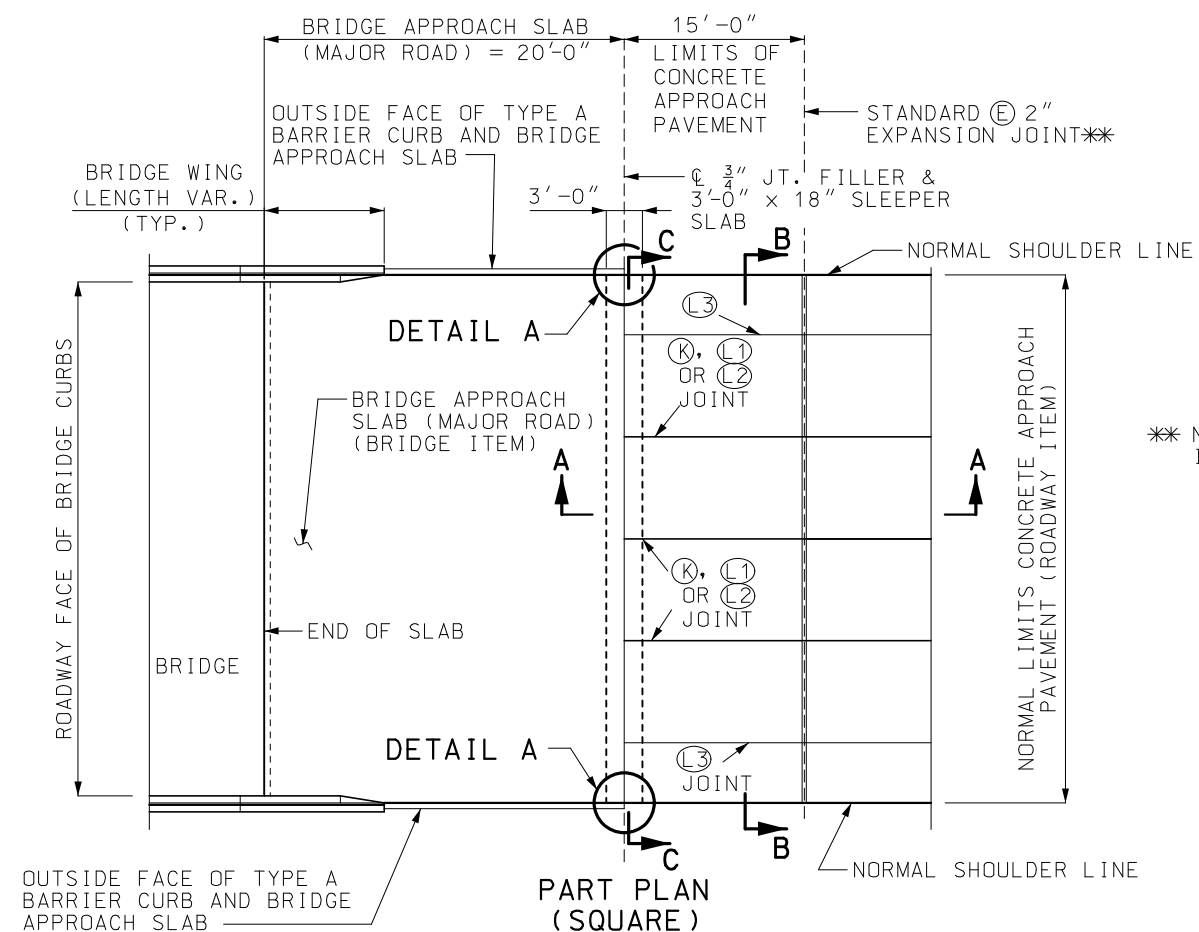
NOTE:
SHORT SIDE OF SKEWED SLAB FOR ALL
LANES NEXT TO BRIDGE APPROACH SLAB
SHALL BE 5' TO 10'.



DETAIL B





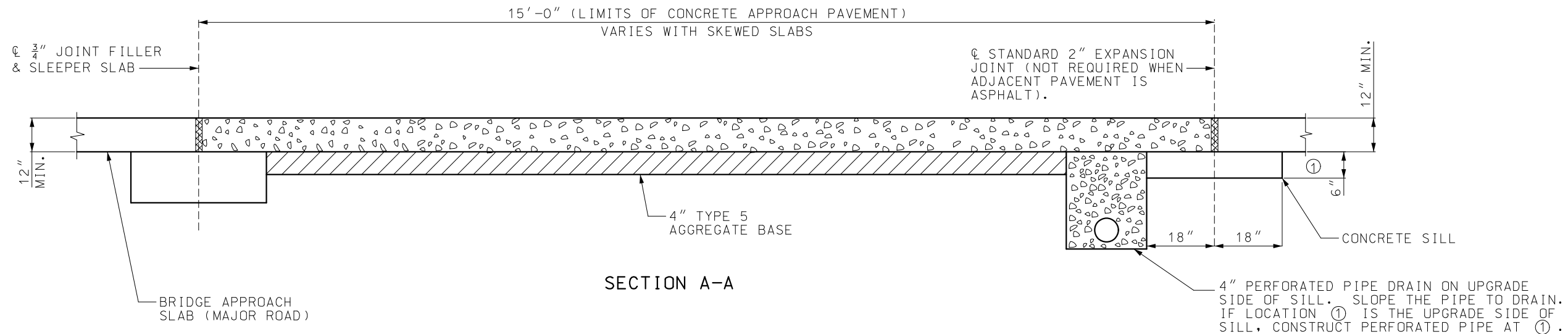
DETAIL A



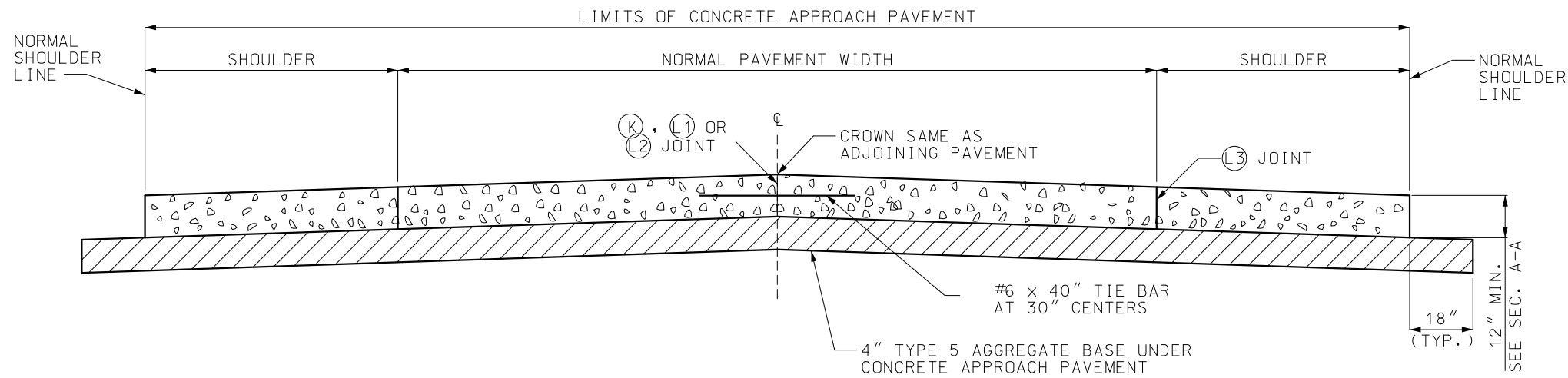
** NOT REQUIRED WHEN ADJACENT PAVEMENT
IS ASPHALT.

NOTE:
FOR SECTIONS A-A, B-B AND C-C,
SEE SHEET 3 OF 3.

| | | | |
|---|---|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p align="center">CONCRETE APPROACH PAVEMENT</p> <p align="center">FOR MULTI-LANE PAVEMENTS (MAJOR ROAD)</p> | | |
| DATE EFFECTIVE: <u>10/01/2020</u> DATE PREPARED: <u>7/21/2020</u> | <p align="center">504.00K</p> | | SHEET NO. 2 OF 3 |

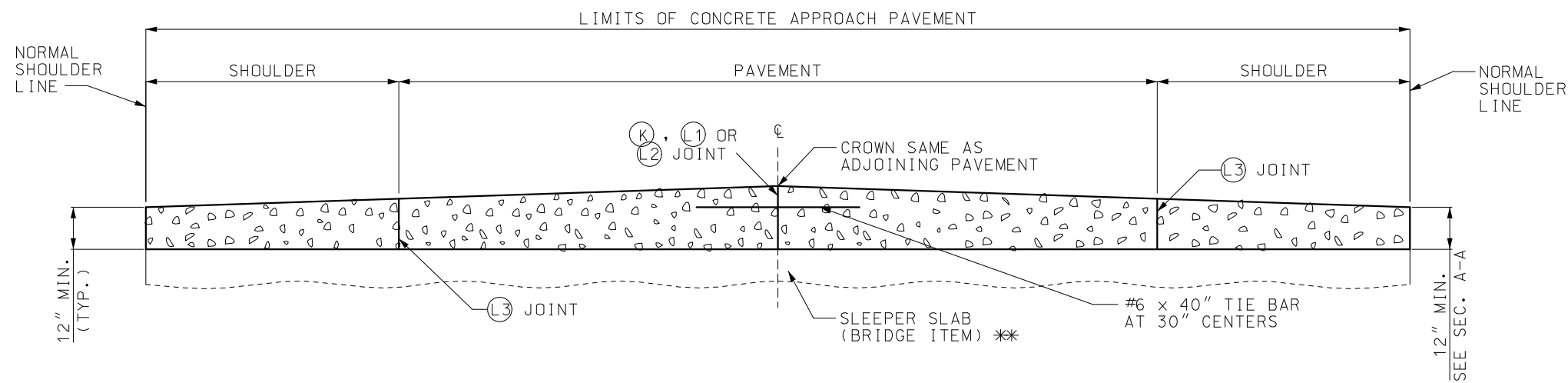


SECTION A-A



SECTION B-B

FOR LOCATIONS OF SECTIONS A-A, B-B AND C-C, SEE SHEETS 1 AND 2.



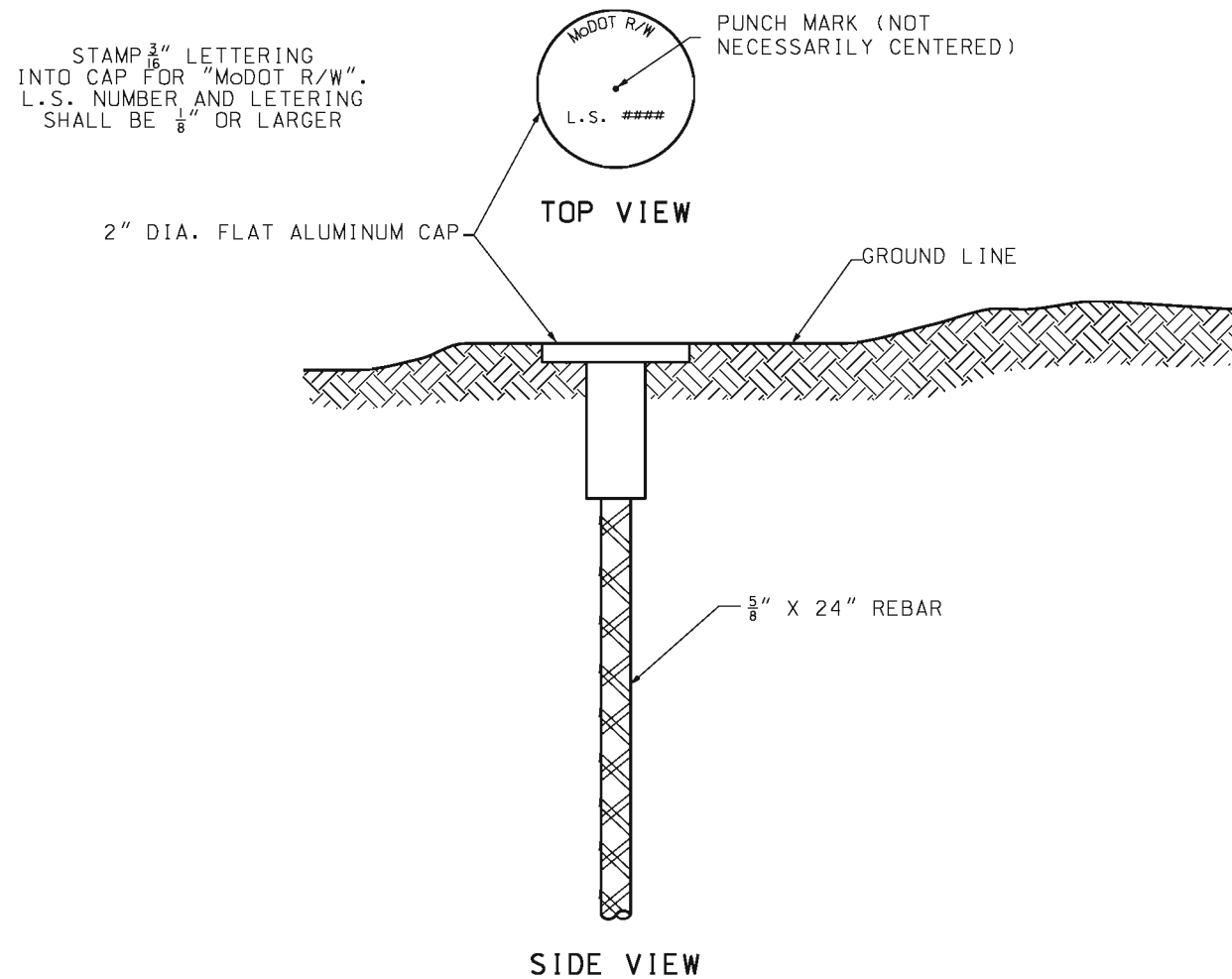
SECTION C-C

** TOP OF SLEEPER SLAB MAY BE FLAT OR CROWNED. SEE BRIDGE PLANS.

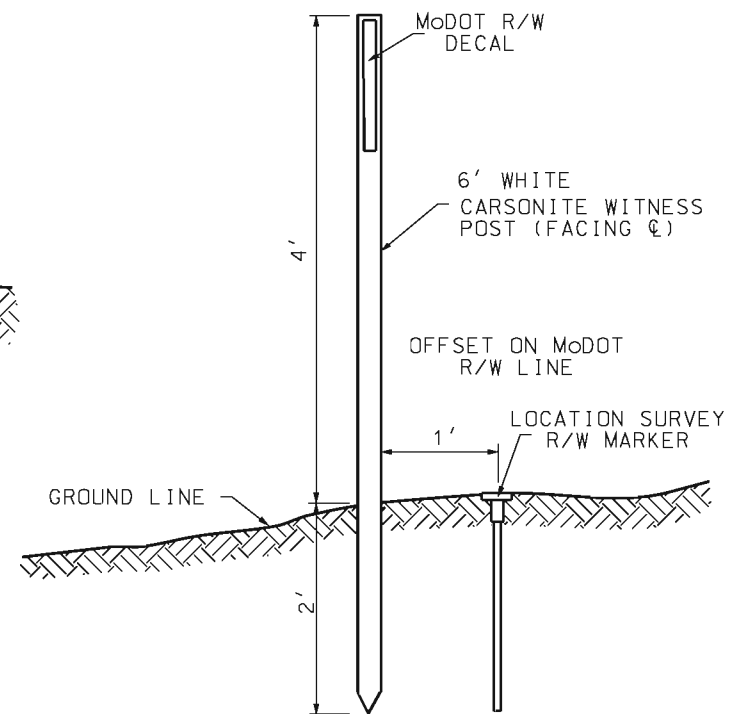
GENERAL NOTES:

SEE STANDARD DRAWING 605.10 FOR PIPE OUTLET DETAIL FROM SHOULDER POINT TO INSLOPE.

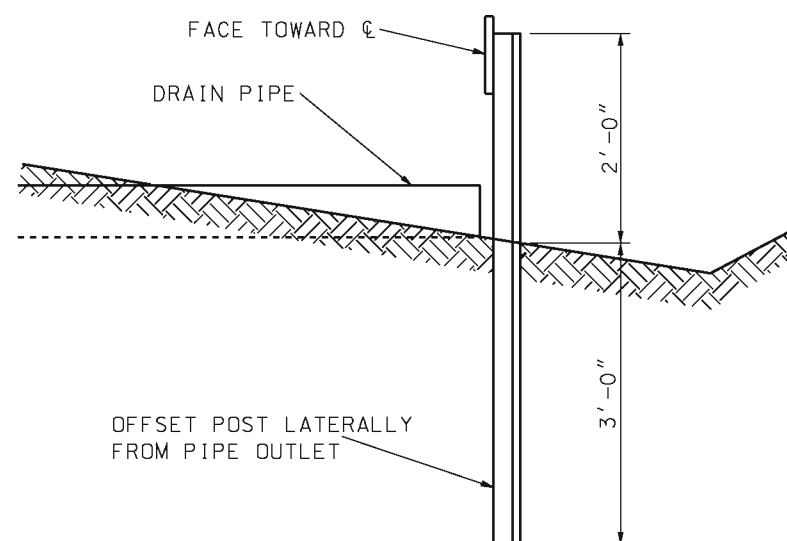
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE APPROACH PAVEMENT (MAJOR ROAD) |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | 504.00K |
| SHEET NO. 3 OF 3 | |



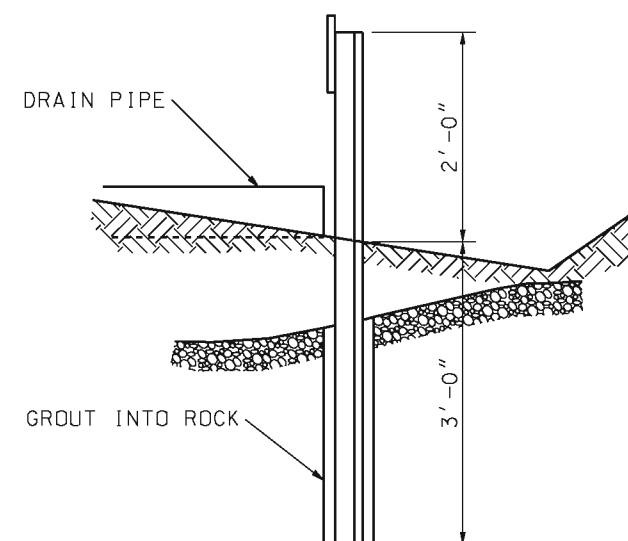
LOCATION SURVEY RIGHT-OF-WAY MARKER



WITNESS POST



IN EARTH


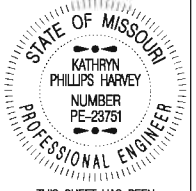


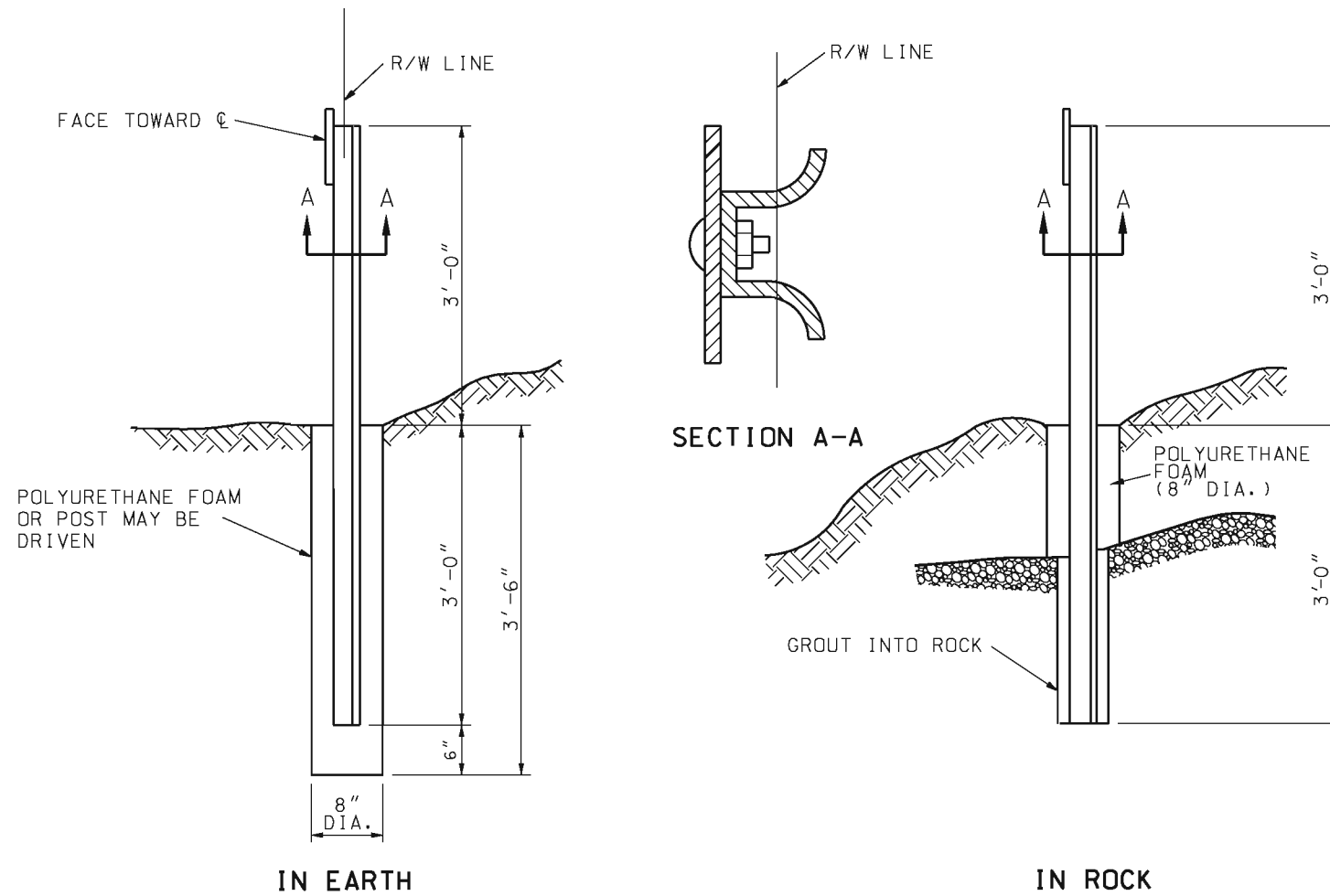
IN ROCK

DRAIN MARKER

GENERAL NOTES:

WHEN STEEL AND LOCATION SURVEY R/W MARKERS ARE NOT SUITABLE DUE TO NATURAL GROUND FEATURES OR MAN-MADE STRUCTURES, ALTERNATIVE MONUMENTATION (IN COMPLIANCE WITH THE APPROVED MONUMENTATION, AS SPECIFIED BY THE MISSOURI MINIMUM STANDARDS FOR PROPERTY BOUNDARY SURVEYS) MAY BE SET.

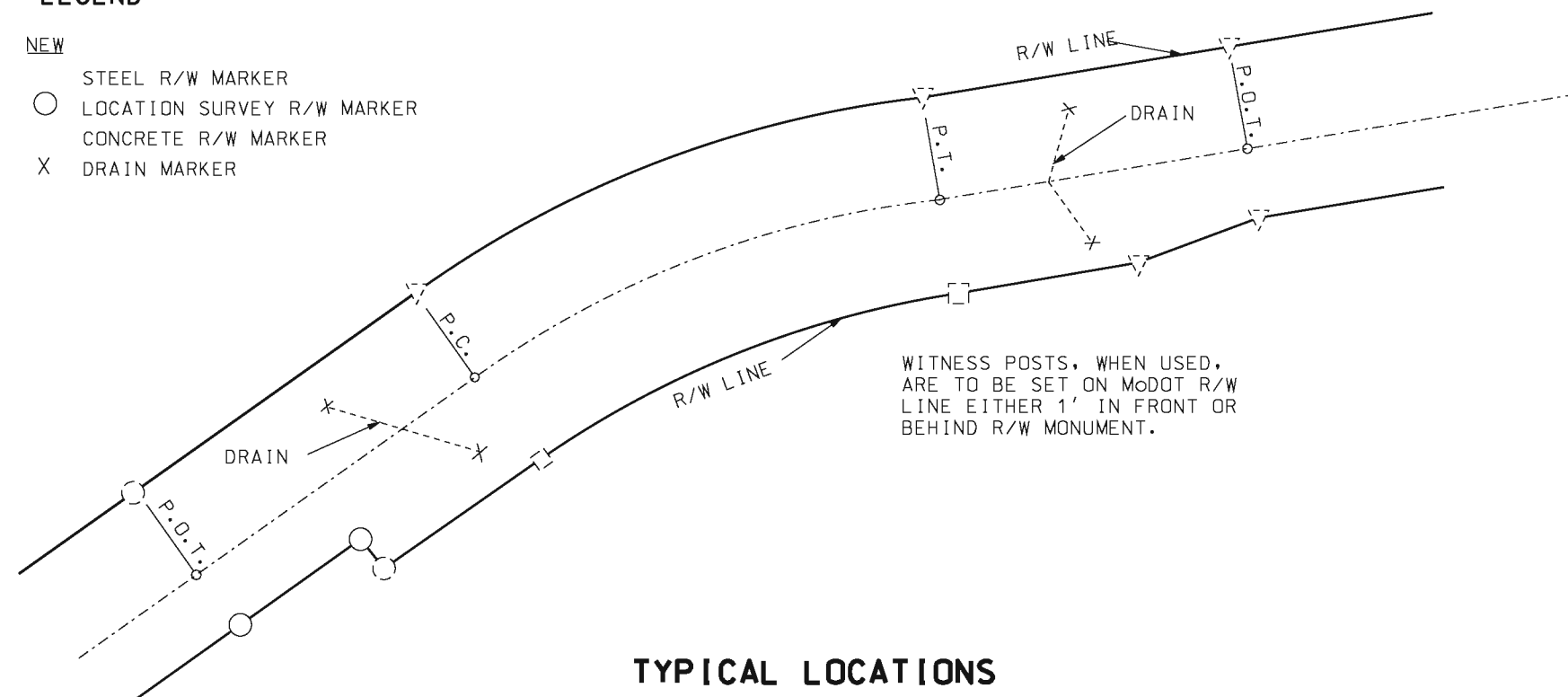
| | |
|--|---------------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | RIGHT-OF-WAY AND DRAIN MARKERS |
| DATE EFFECTIVE: 01/01/2003 DATE PREPARED: 8/21/2009 | 602.00D |
| SHEET NO. 1 OF 2 | |



STEEL RIGHT-OF-WAY MARKER

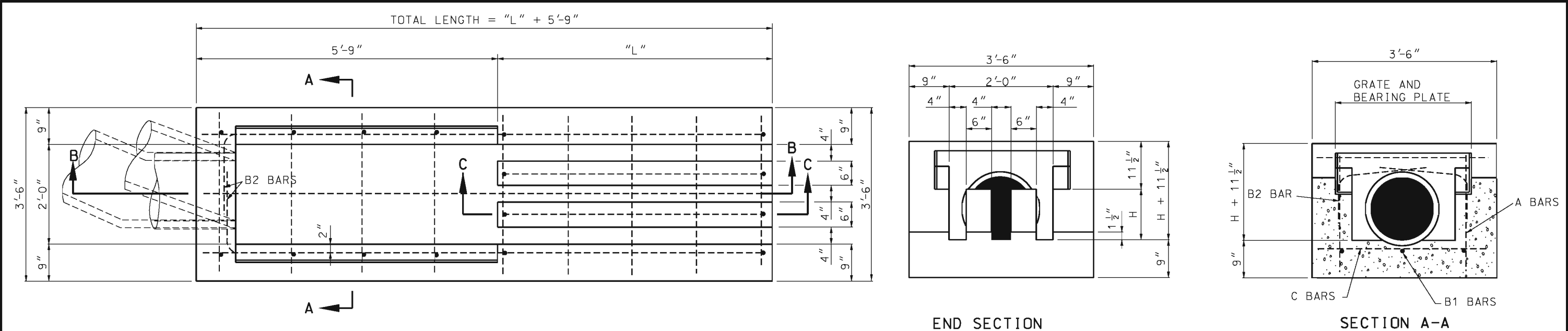
LEGEND

| EXISTING | NEW | |
|----------|-----|----------------------------|
| | | STEEL R/W MARKER |
| | | LOCATION SURVEY R/W MARKER |
| | | CONCRETE R/W MARKER |
| | | X DRAIN MARKER |



TYPICAL LOCATIONS

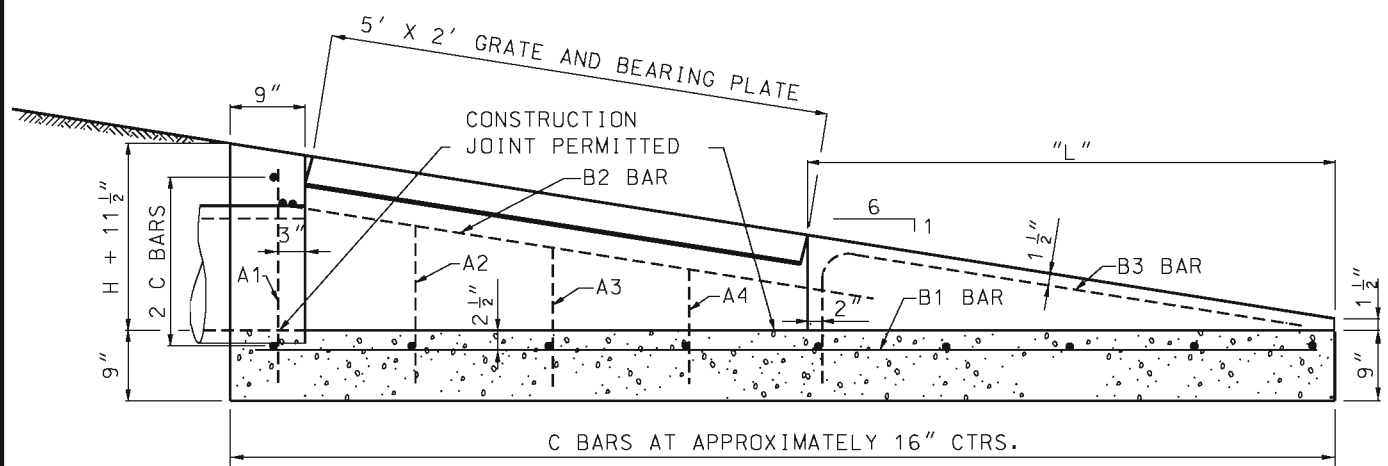
| | | | |
|--|--|--|--|
| | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | | RIGHT-OF-WAY AND DRAIN MARKERS | |
| DATE EFFECTIVE: 01/01/2003 DATE PREPARED: 8/21/2009 | | 602.00D | |
| | | SHEET NO. 2 OF 2 | |



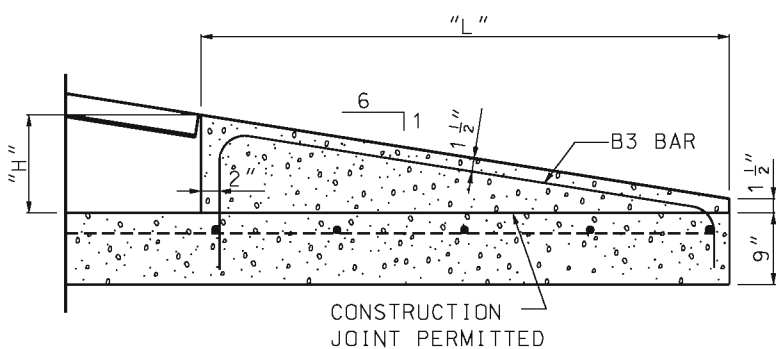
PLAN VIEW

END SECTION

SECTION A-A



SECTION B-B



SECTION C-C

GENERAL NOTES:

USE RIGHT ANGLE HEADWALL FOR ALL INSTALLATIONS. SKEW PIPE BY USING A BEVELED END OR ELBOW ON PIPE. IN SPECIAL CASES, HEADWALL MAY BE TURNED TO FIT PIPE SKEW AND 1V TO 6H SLOPE WARPED TO FIT HEADWALL.

ALL CONCRETE SHALL BE CLASS "B".

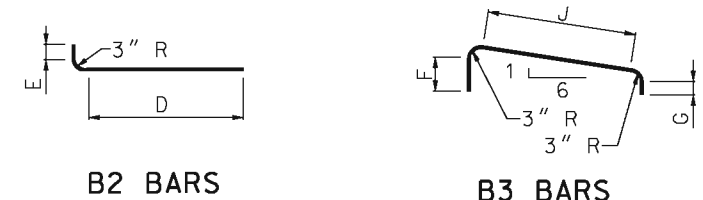
THIS DRAWING AND THE CONCRETE QUANTITIES SHOWN ARE BASED ON THE USE OF CONCRETE PIPE. QUANTITIES OF CONCRETE SHOWN WILL BE USED FOR PAYMENT REGARDLESS OF ANY QUANTITY CHANGES NECESSARY DUE TO THE USE OF ANY OTHER TYPE PIPE SPECIFIED OR PERMITTED.

FLOW LINE OF HEADWALL IS TO BE PLACED HORIZONTALLY.


PRECAST NOTES:

THE CONTRACTOR MAY, SUBJECT TO APPROVAL OF THE ENGINEER, FURNISH PRECAST UNITS IN LIEU OF CAST-IN-PLACE. IF A PRECAST UNIT IS FURNISHED, IT SHALL CONFORM IN ALL RESPECTS TO THE THE REQUIREMENTS FOR CAST-IN-PLACE UNITS INCLUDING DIMENSIONS AND REINFORCEMENT, EXCEPT THAT THE FORMS MAY BE TAPERED TO FACILITATE REMOVAL OF THE UNIT FROM THE FORMS. SHOP DRAWINGS OF THE PRECAST UNIT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO FIRST USE OF THE PRECASTING FORMS.

| PIPE SIZE | DIMENSIONS | | | QUANTITIES | | REINFORCING | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|-------|-----------------|----------------|---------------|-------------|--------|------------|--------|------------|--------|------------|--------|------------|--------|------------|-------|-------|------------|-----|--------|----|--------|-----------|-----|--------|
| | "H" | "L " | TOTAL LENGTH | CONC. C. Y. | STEEL LBS. | #4 A1 BARS | | #4 A2 BARS | | #4 A3 BARS | | #4 A4 BARS | | #4 B1 BARS | | #4 B2 BARS | | | #4 B3 BARS | | | | | #4 C BARS | | |
| | | | | | | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | E | D | LENGTH | NO. | F | G | J | LENGTH | NO. | LENGTH |
| 12" | 9" | 3'-9" | 9'-6" | 1.5 | 70 | 2 | 2'-0" | 2 | 1'-6" | 2 | 1'-3" | 2 | 1'-0" | 3 | 9'-3" | 2 | 1'-5" | 5'-8" | 7'-6" | 4 | 11" | 5" | 2'-11" | 5'-0" | 8 | 3'-3" |
| 15" | 1'-0" | 5'-3" | 11'-0" | 1.8 | 80 | 2 | 2'-3" | 2 | 1'-9" | 2 | 1'-6" | 2 | 1'-3" | 3 | 10'-9" | 2 | 1'-5" | 5'-8" | 7'-6" | 4 | 1'-2" | 5" | 4'-5" | 6'-9" | 9 | 3'-3" |
| 18" | 1'-3" | 6'-9" | 12'-6" | 2.2 | 90 | 2 | 2'-6" | 2 | 2'-0" | 2 | 1'-9" | 2 | 1'-6" | 3 | 12'-3" | 2 | 1'-5" | 5'-8" | 7'-6" | 4 | 1'-5" | 5" | 5'-11" | 8'-6" | 10 | 3'-3" |
| 21" | 1'-6" | 8'-3" | 14'-0" | 2.6 | 100 | 2 | 2'-9" | 2 | 2'-3" | 2 | 2'-0" | 2 | 1'-9" | 3 | 13'-9" | 2 | 1'-5" | 5'-8" | 7'-6" | 4 | 1'-8" | 5" | 7'-5" | 10'-3" | 11 | 3'-3" |
| 24" | 1'-9" | 9'-9" | 15'-6" | 3.0 | 110 | 2 | 3'-0" | 2 | 2'-6" | 2 | 2'-3" | 2 | 2'-0" | 3 | 15'-3" | 2 | 1'-5" | 5'-8" | 7'-6" | 4 | 1'-11" | 5" | 8'-11" | 12'-0" | 12 | 3'-3" |

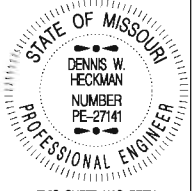


BENDING DETAILS



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



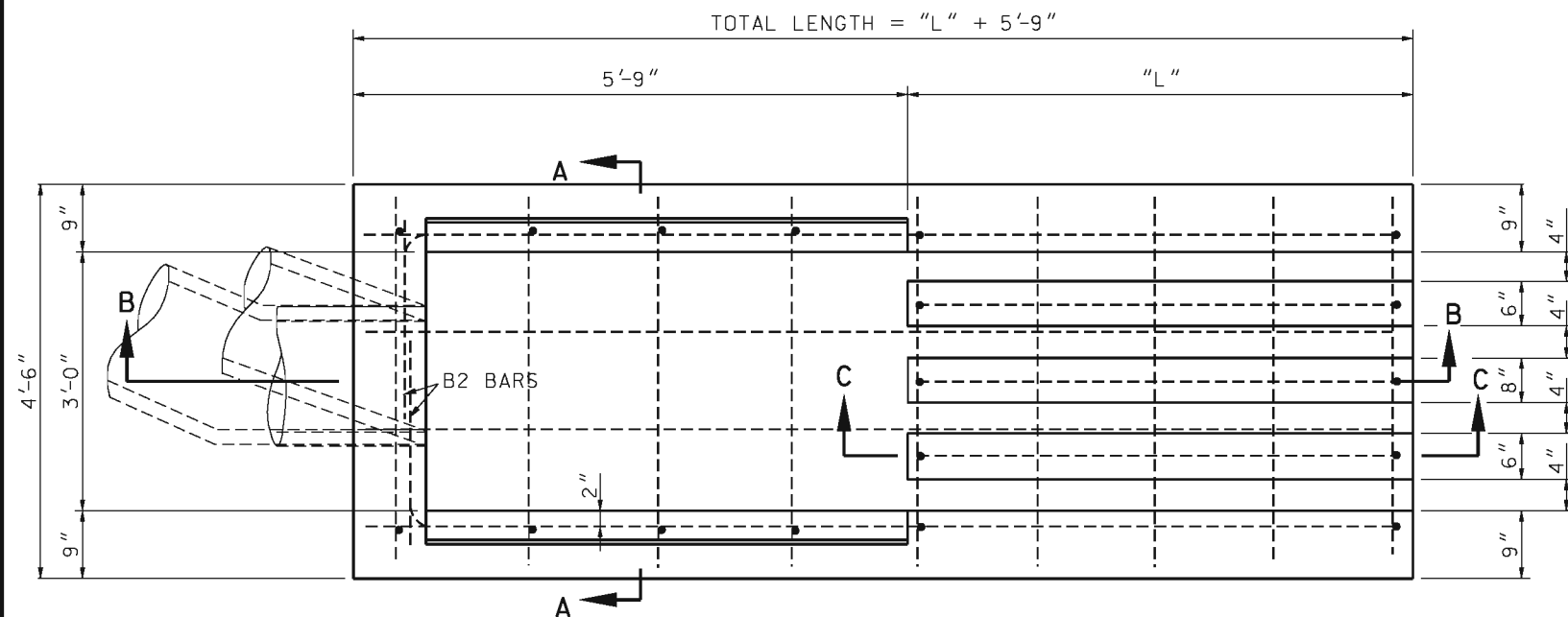
STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

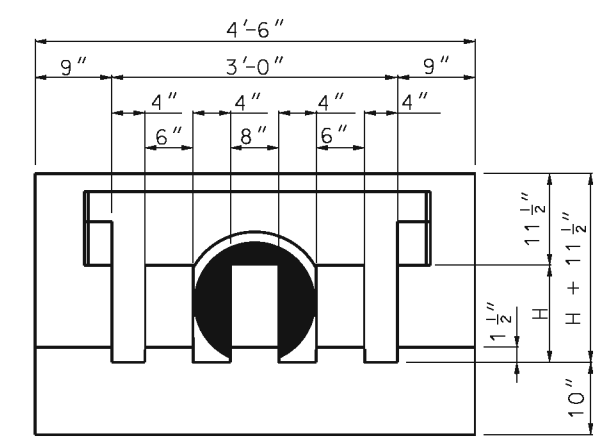
PIPE CULVERT HEADWALLS
TYPE S
12" TO 24" DIAMETERS
- 1V:6H SLOPES

| | | | |
|-----------------|------------|---------|---------------------|
| DATE EFFECTIVE: | 08/01/2006 | 604.05D | SHEET NO. 1 OF 2 |
| DATE PREPARED: | 9/3/2009 | | |

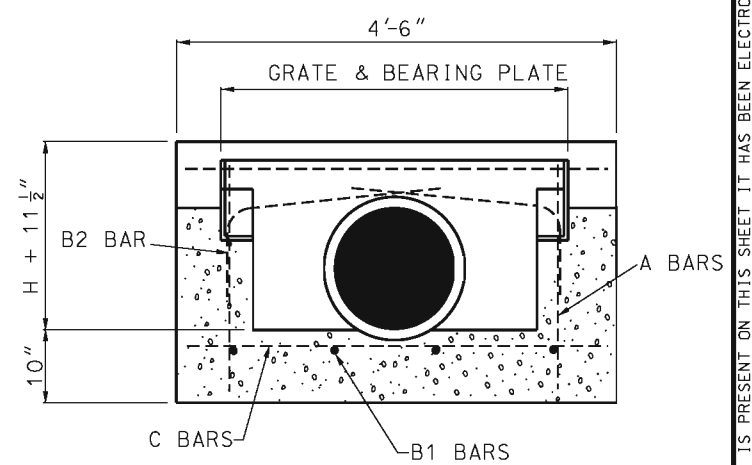
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



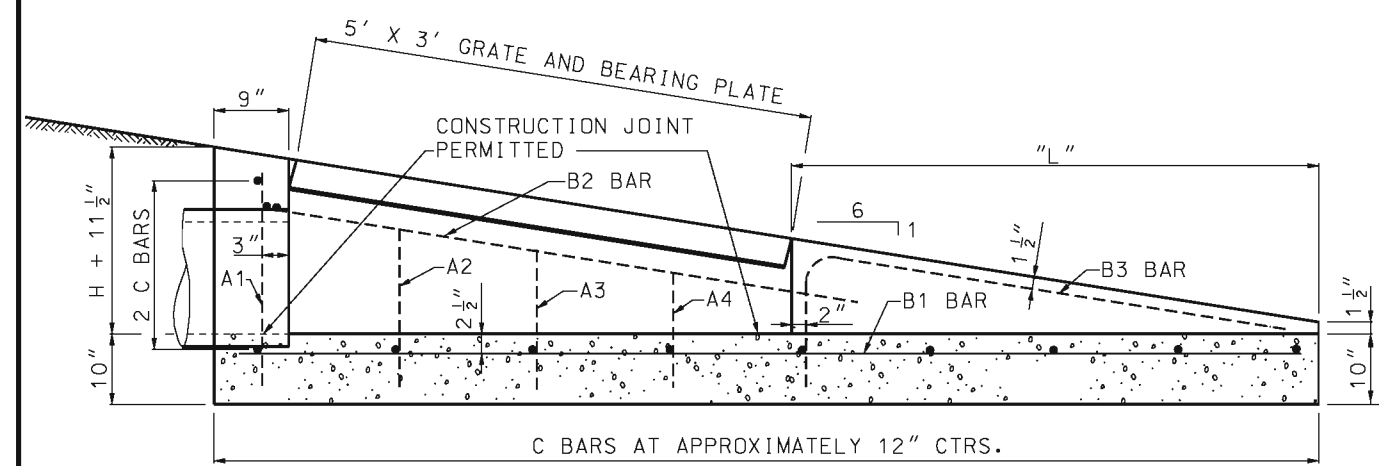
PLAN VIEW



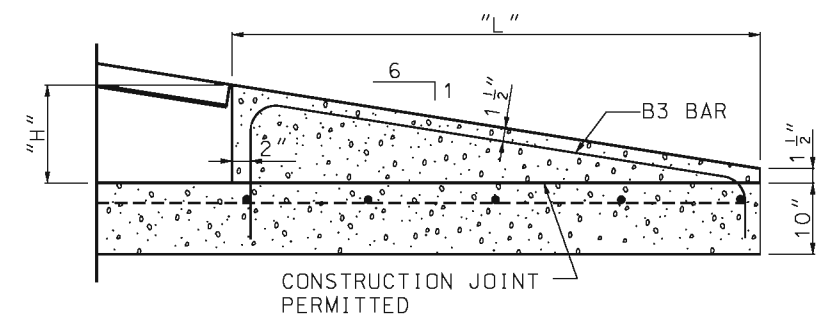
END SECTION



SECTION A-A

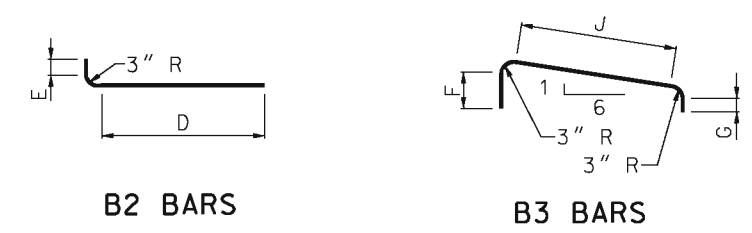


SECTION B-B




SECTION C-C

| PIPE SIZE | DIMENSIONS | | | QUANTITIES | | REINFORCING | | | | | | | | | | | | | | | | | | | | |
|--------------|------------|--------|-----------------|----------------|---------------|-------------|--------|------------|--------|------------|--------|------------|--------|------------|--------|------------|--------|-------|------------|-----|--------|----|---------|-----------|-----|--------|
| | "H" | "L " | TOTAL LENGTH | CONC. C. Y. | STEEL LBS. | #4 A1 BARS | | #4 A2 BARS | | #4 A3 BARS | | #4 A4 BARS | | #4 B1 BARS | | #4 B2 BARS | | | #4 B3 BARS | | | | | #4 C BARS | | |
| | | | | | | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | E | D | LENGTH | NO. | F | G | J | LENGTH | NO. | LENGTH |
| 27" | 2'-0" | 11'-3" | 17'-0" | 4.5 | 160 | 2 | 3'-3" | 2 | 2'-9" | 2 | 2'-6" | 2 | 2'-3" | 4 | 16'-9" | 2 | 1'-11" | 5'-8" | 8'-0" | 5 | 2'-2" | 5" | 10'-5" | 13'-9" | 18 | 4'-3" |
| 30" | 2'-3" | 12'-9" | 18'-6" | 5.0 | 170 | 2 | 3'-6" | 2 | 3'-0" | 2 | 2'-9" | 2 | 2'-6" | 4 | 18'-3" | 2 | 1'-11" | 5'-8" | 8'-0" | 5 | 2'-5" | 5" | 11'-11" | 15'-6" | 19 | 4'-3" |
| 36" | 2'-9" | 15'-9" | 21'-6" | 6.1 | 200 | 2 | 4'-0" | 2 | 3'-6" | 2 | 3'-3" | 2 | 3'-0" | 4 | 21'-3" | 2 | 1'-11" | 5'-8" | 8'-0" | 5 | 2'-11" | 5" | 14'-11" | 19'-0" | 21 | 4'-3" |



BENDING DETAILS

GENERAL NOTES:
SEE GENERAL NOTES ON SHEET 1.

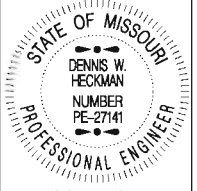


MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

PIPE CULVERT HEADWALLS

TYPE S
27" TO 36" DIAMETERS
- 1V:6H SLOPES



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

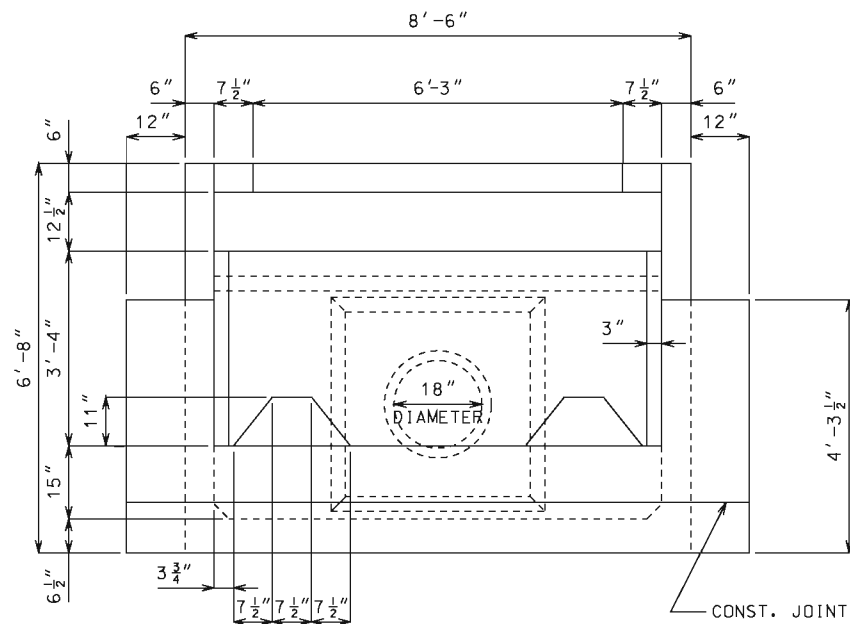
DATE EFFECTIVE: 08/01/2006

DATE PREPARED: 9/3/2009

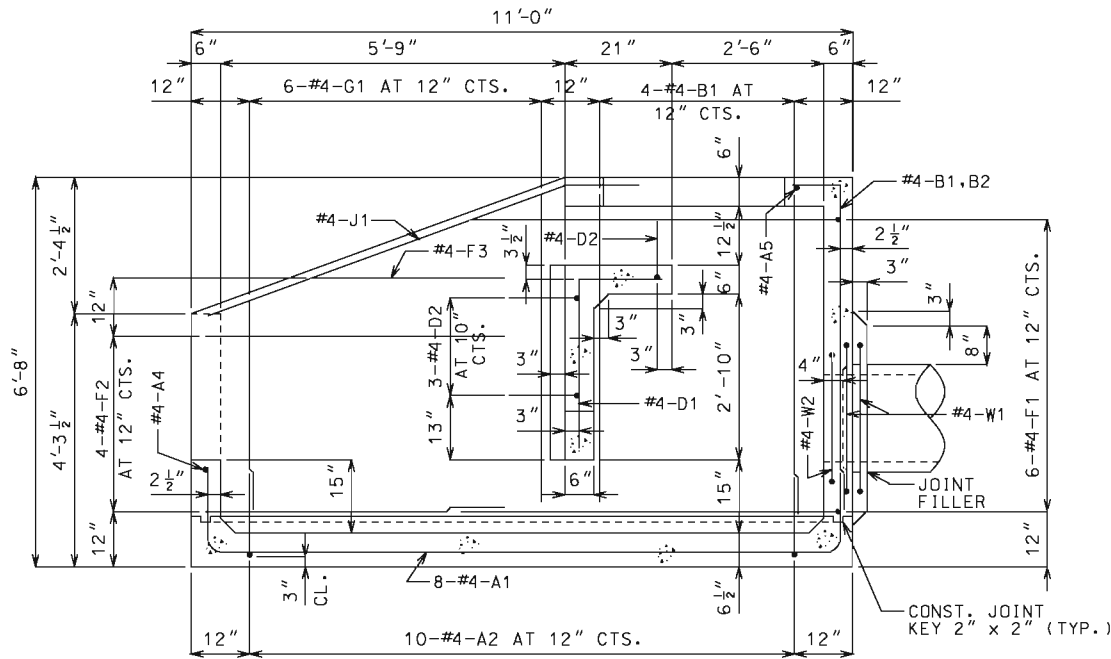
604.05D

SHEET NO.
2 OF 2

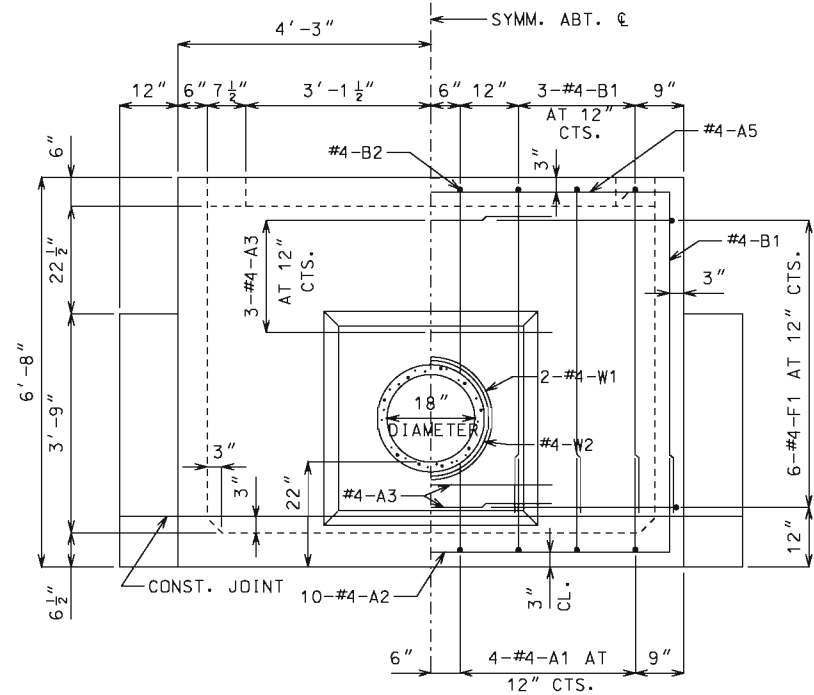
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION



SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE $f'_c = 3,000$ psi
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ psi

REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL
SHALL BE $1\frac{1}{2}$ " UNLESS SHOWN OTHERWISE.

DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

| ESTIMATED QUANTITIES | | | |
|----------------------|---------|-----|-------|
| ITEM | | | TOTAL |
| CLASS B CONCRETE | CU. YD. | 6.1 | |
| REINFORCING STEEL | LBS. | 490 | |

| COMPLETE BILL OF REINFORCING STEEL | | | | | | | | | | | | | BENDING DIAGRAMS | | | |
|------------------------------------|-------|----------|-----------|------------|----------|------------|----------------------------|---------|----------|----------|----------|----------|------------------|----------------|---------------|--------|
| NO. | REQ'D | MARK NO. | SHAPE NO. | VARIES (V) | NO. EACH | DIMENSIONS | | | | | | | | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |
| | | | | | | B | C | D | E | F | H | K | | | | |
| | | SIZE | MARK | | | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | LBS. | |
| 8 | 4 | A1 | 11 | | | | 0-16 1/2 | 10-7 | 0-17 3/4 | | | | 13-5 | 13-3 | 71 | |
| 10 | 4 | A2 | 11 | | | | 0-18 1/2 | 8-0 | 0-18 1/2 | | | | 11-1 | 10-10 | 72 | |
| 5 | 4 | A3 | 20 | | | 4-6 | | | | | | | 4-6 | 4-6 | 15 | |
| 1 | 4 | A4 | 20 | | | 10-3 | | | | | | | 10-3 | 10-3 | 7 | |
| 1 | 4 | A5 | 20 | | | 8-3 | | | | | | | 8-3 | 8-3 | 6 | |
| 14 | 4 | B1 | 19 | | | 5-9 | 0-9 | | | | | | 6-6 | 6-4 | 59 | |
| 2 | 4 | B2 | 19 | | | 2-11 | 0-9 | | | | | | 3-8 | 3-6 | 5 | |
| 7 | 4 | D1 | 19 | | | 2-11 | 0-16 | | | | | | 4-3 | 4-2 | 19 | |
| 4 | 4 | D2 | 11 | | | | 0-20 1/2 | 8-0 | 0-20 1/2 | | | | 11-5 | 11-3 | 30 | |
| 1 | 4 | D3 | 15 | | | 2-1 1/2 | 2-11 1/2 | 2-1 1/2 | 0-21 5/8 | 0-13 1/2 | 0-21 5/8 | 0-13 1/2 | 7-3 | 7-2 | 5 | |
| 2 | 4 | D4 | 14 | | | 0-12 | 0-6 | 2-1 1/2 | | | 0-21 5/8 | 0-13 1/2 | 3-8 | 3-6 | 5 | |
| 2 | 4 | E1 | 23 | | | 0-13 | 4-0 3/8 | | | 0-9 3/8 | 0-9 | | 5-1 | 5-1 | 7 | |
| 12 | 4 | F1 | 19 | | | 2-10 1/2 | 6-4 1/8 | | | | | | 9-3 | 9-1 | 73 | |
| 8 | 4 | F2 | 19 | | | 0-13 | 5-9 | | | | | | 6-10 | 6-9 | 36 | |
| 2 | 4 | F3 | 20 | | | 4-0 | | | | | | | 4-0 | 4-0 | 5 | |
| 12 | 4 | G1 | 20 | V | 2 | 5-8 | | | | | | | 5-8 | 5-8 | | |
| | | | | | | 3-9 | (INCREMENT = 4 3/8 INCHES) | | | | | | 3-9 | 3-9 | 38 | |
| 2 | 4 | J1 | 20 | | | 7-5 | | | | | | | 7-5 | 7-5 | 10 | |
| 2 | 4 | J2 | 19 | | | 3-10 3/4 | 2-1 1/2 | | | | | | 6-0 | 5-11 | 8 | |
| 2 | 4 | W1 | 16 | | | 2-4 | | | | | | | 8-2 | 8-2 | 11 | |
| 1 | 4 | W2 | 16 | | | 0-23 | | | | | | | 6-11 | 6-11 | 5 | |

SHAPE 11 SHAPE 14 SHAPE 15

SHAPE 16 SHAPE 19 SHAPE 20

SHAPE 23 Detailing Dimension 90° STANDARD HOOKS

ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

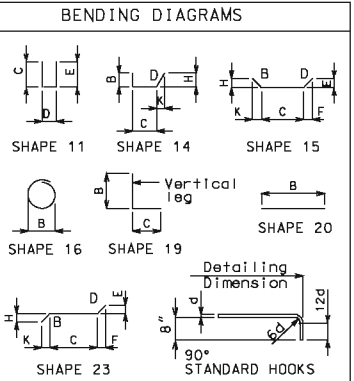
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

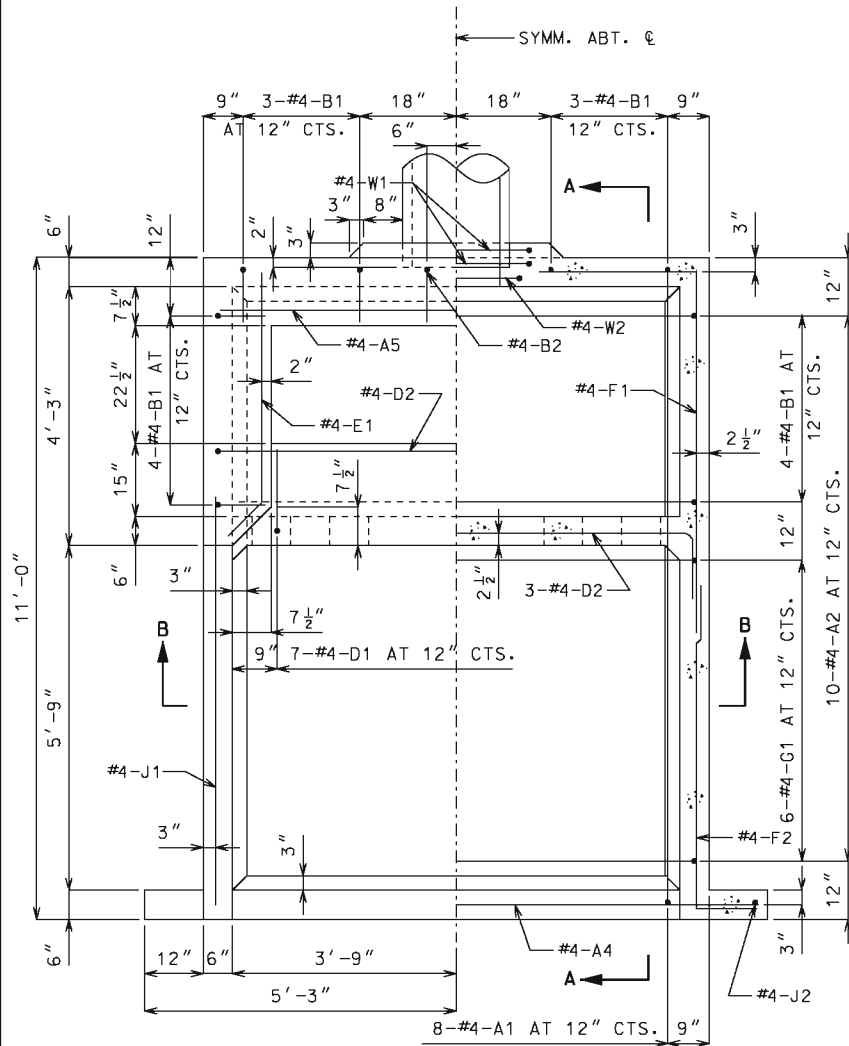
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

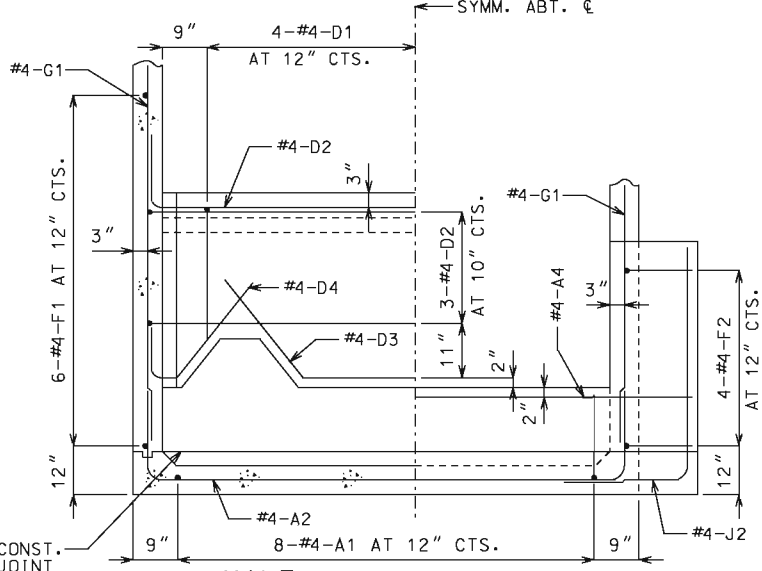
LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF PLAN HALF HORIZONTAL SECTION



HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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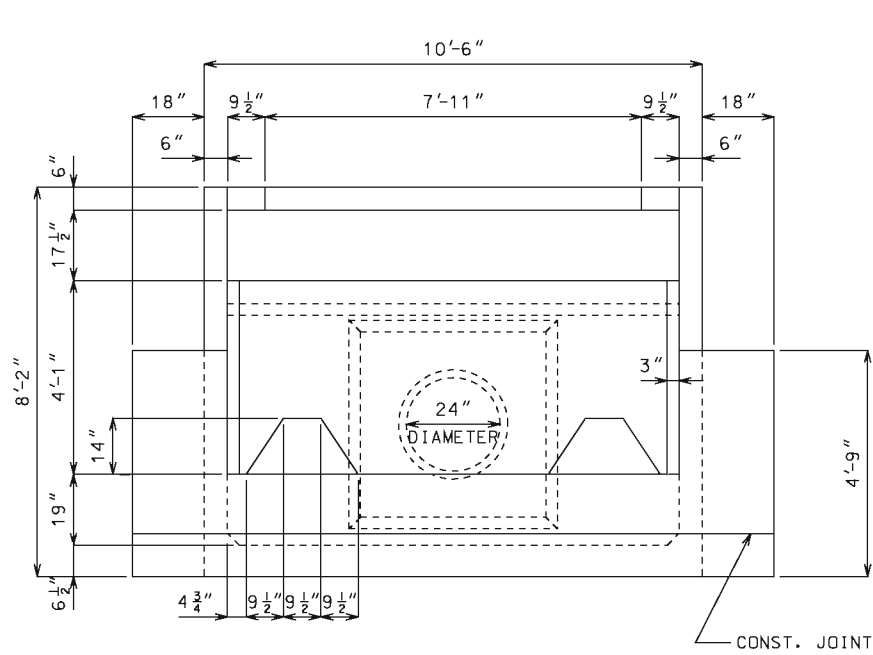
PIPE CULVERT HEADWALL
ENERGY DISSIPATOR (IMPACT TYPE)
FOR 18" CONCRETE PIPE

DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009

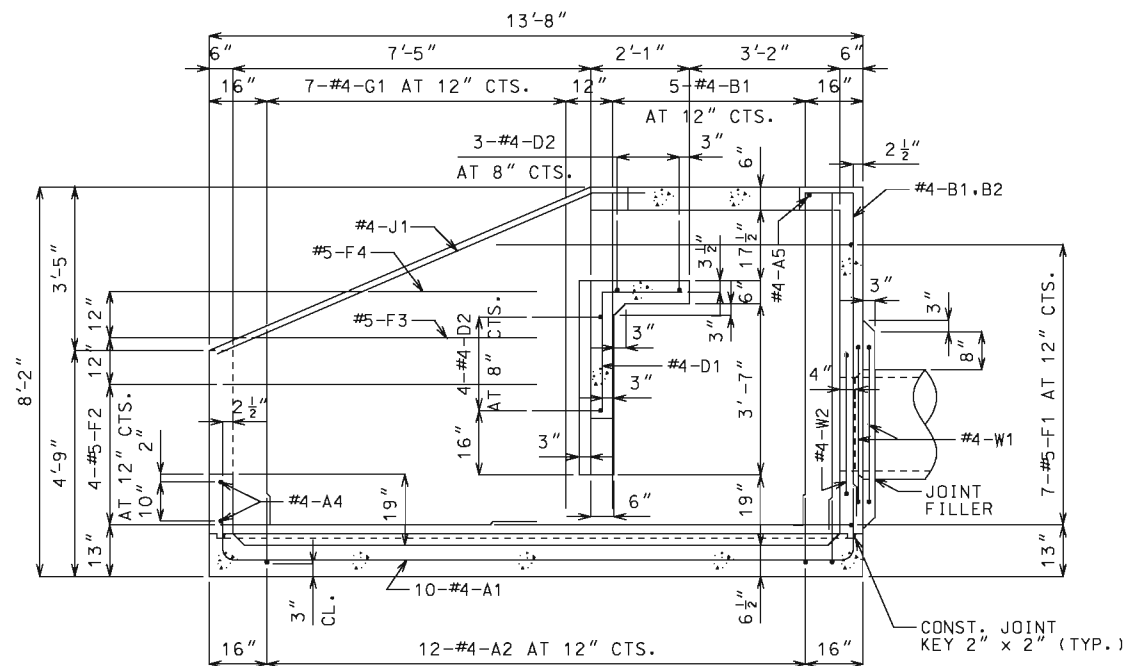
604.10E

SHEET NO.
1 OF 1

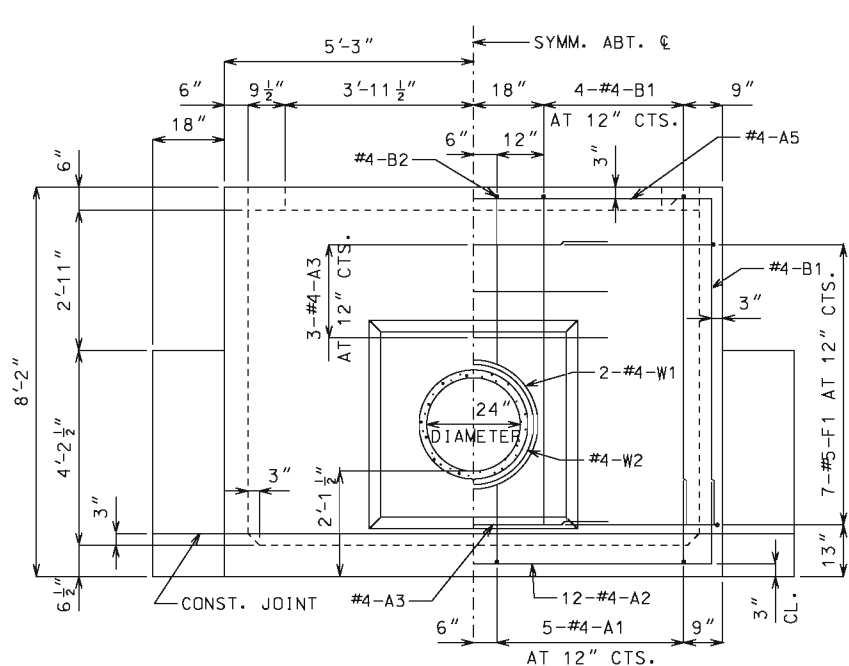
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION

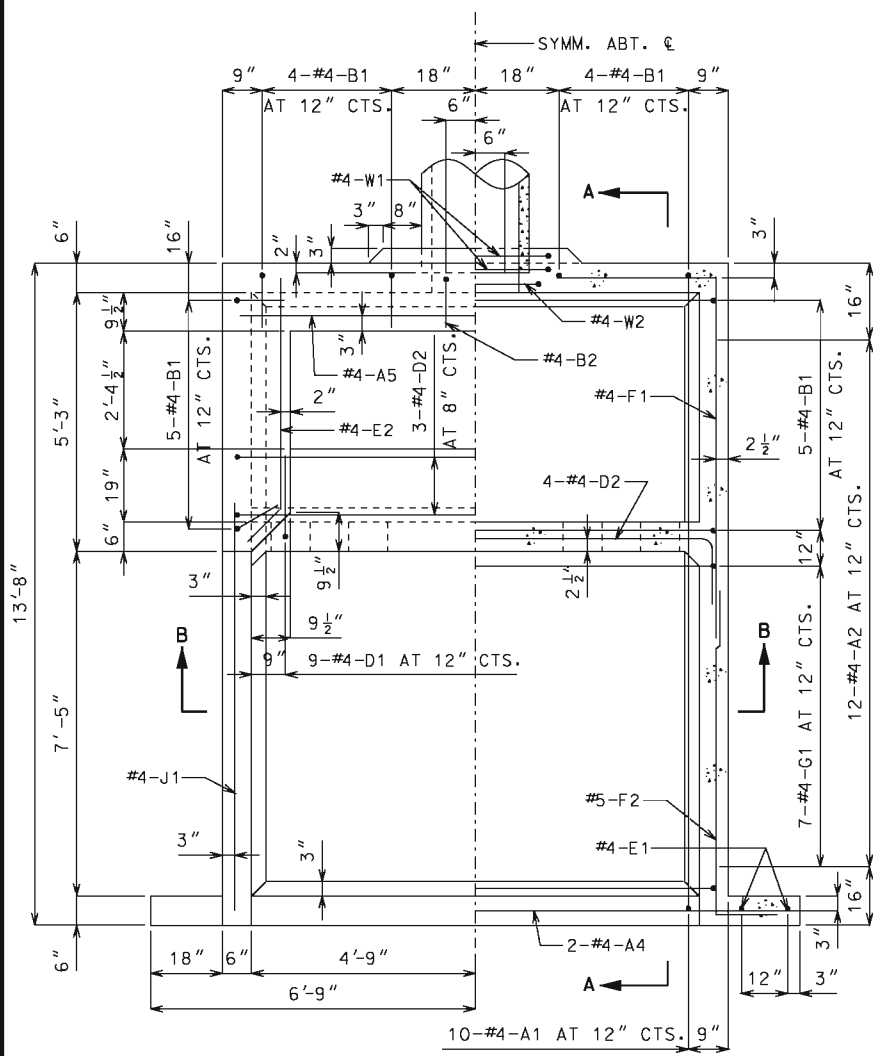


SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.



HALF PLAN HALF HORIZONTAL SECTION

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE $f'c = 3,000$ psi
REINFORCING STEEL (GRADE 60) $fy = 60,000$ psi

REINFORCING STEEL




MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ " UNLESS SHOWN OTHERWISE.

DIMENSIONS




DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

| ESTIMATED QUANTITIES | | |
|----------------------|---------|-------|
| ITEM | | TOTAL |
| CLASS B CONCRETE | CU. YD. | 9.5 |
| REINFORCING STEEL | LBS. | 820 |



| COMPLETE BILL OF REINFORCING STEEL | | | | | | | | | | | | | BENDING DIAGRAMS | | |
|------------------------------------|-------|----------|-----------|---------------------|-------------------|--------------------------------------|--------------------|--------------------|--------------------|-------------------|--------------------|---------|------------------|---------------|--------|
| NO. | REQ'D | MARK NO. | SHAPE NO. | VARIES (V) NO. EACH | DIMENSIONS | | | | | | | | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |
| | | | | | B | C | D | E | F | H | K | | | | |
| | | SIZE | MARK | | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | LBS. | |
| 10 | 4 | A1 | 11 | | | 0-20 $\frac{1}{4}$ | 13-2 $\frac{1}{2}$ | 0-17 $\frac{3}{4}$ | | | | | 16-5 | 16-2 | 108 |
| 12 | 4 | A2 | 11 | | | 0-18 $\frac{3}{4}$ | 10-0 | 0-18 $\frac{3}{4}$ | | | | | 13-2 | 12-11 | 104 |
| 4 | 4 | A3 | 20 | | 5-0 | | | | | | | | 5-0 | 5-0 | 13 |
| 2 | 4 | A4 | 20 | | 13-3 | | | | | | | | 13-3 | 13-3 | 18 |
| 1 | 4 | A5 | 20 | | 10-3 | | | | | | | | 10-3 | 10-3 | 7 |
| 18 | 4 | B1 | 19 | | 7-1 $\frac{1}{2}$ | 0-12 | | | | | | | 8-2 | 8-0 | 96 |
| 2 | 4 | B2 | 19 | | 3-8 | 0-10 | | | | | | | 4-6 | 4-5 | 6 |
| 9 | 4 | D1 | 19 | | 3-8 | 0-20 $\frac{1}{2}$ | | | | | | | 5-5 | 5-3 | 32 |
| 7 | 4 | D2 | 11 | | | 0-19 | 10-1 | 0-19 | | | | | 13-3 | 13-1 | 61 |
| 1 | 4 | D3 | 15 | | 2-9 $\frac{1}{8}$ | 3-10 | 2-9 $\frac{1}{8}$ | 2-3 $\frac{1}{2}$ | 0-18 $\frac{1}{2}$ | 2-3 $\frac{1}{2}$ | 0-18 $\frac{1}{2}$ | 9-4 | 9-3 | 6 | |
| 2 | 4 | D4 | 14 | | 0-12 | 0-7 | 2-9 $\frac{1}{8}$ | | | 2-3 $\frac{1}{2}$ | 0-18 $\frac{1}{2}$ | 4-4 | 4-2 | 6 | |
| 4 | 4 | E1 | 20 | | 4-6 | | | | | | | 4-6 | 4-6 | 12 | |
| 2 | 4 | E2 | 23 | | 0-17 | 5-0 $\frac{1}{2}$ | | | | 0-12 | 0-12 | 6-6 | 6-5 | 9 | |
| 2 | 4 | E3 | 20 | | 2-8 | | | | | | | 2-8 | 2-8 | 4 | |
| 14 | 5 | F1 | 19 | | 3-8 | 7-11 | | | | | | 11-7 | 11-6 | 168 | |
| 8 | 5 | F2 | 19 | | 0-19 | 7-0 | | | | | | 8-7 | 8-6 | 71 | |
| 2 | 5 | F3 | 20 | | 6-0 | | | | | | | 6-0 | 6-0 | 13 | |
| 2 | 5 | F4 | 20 | | 3-9 | | | | | | | 3-9 | 3-9 | 8 | |
| 14 | 4 | G1 | 20 | V 2 | 6-8 | | | | | | | 6-8 | 6-8 | 8 | |
| | | | | | 4-1 | (INCREMENT = 5 $\frac{1}{8}$ INCHES) | | | | | | 4-1 | 4-1 | 50 | |
| 2 | 4 | J1 | 20 | | 9-6 | | | | | | | 9-6 | 9-6 | 13 | |
| 2 | 4 | W1 | 16 | | 2-9 | | | | | | | 9-6 | 9-6 | 13 | |
| 1 | 4 | W2 | 16 | | 2-5 | | | | | | | 8-6 | 8-6 | 6 | |



SHAPE 11 SHAPE 14 SHAPE 15



SHAPE 16 SHAPE 19 SHAPE 20



SHAPE 23 90° STANDARD HOOKS

ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

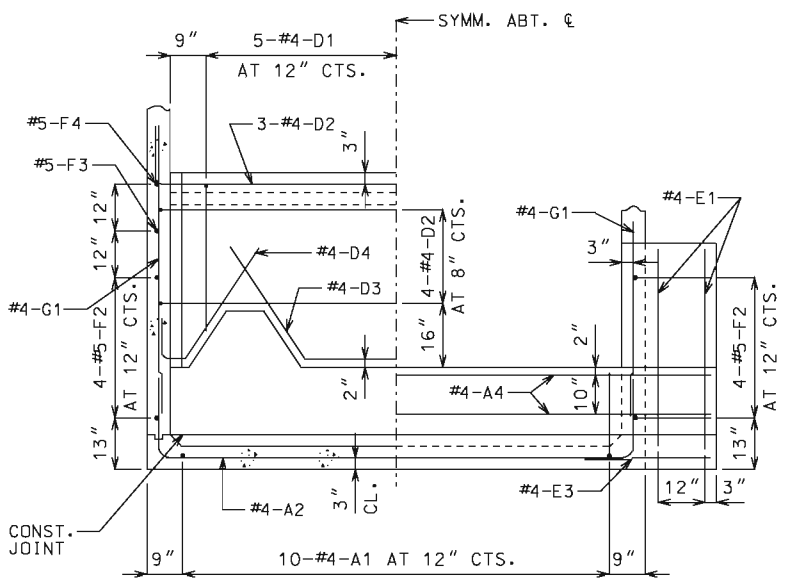
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF SECTION B-B HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

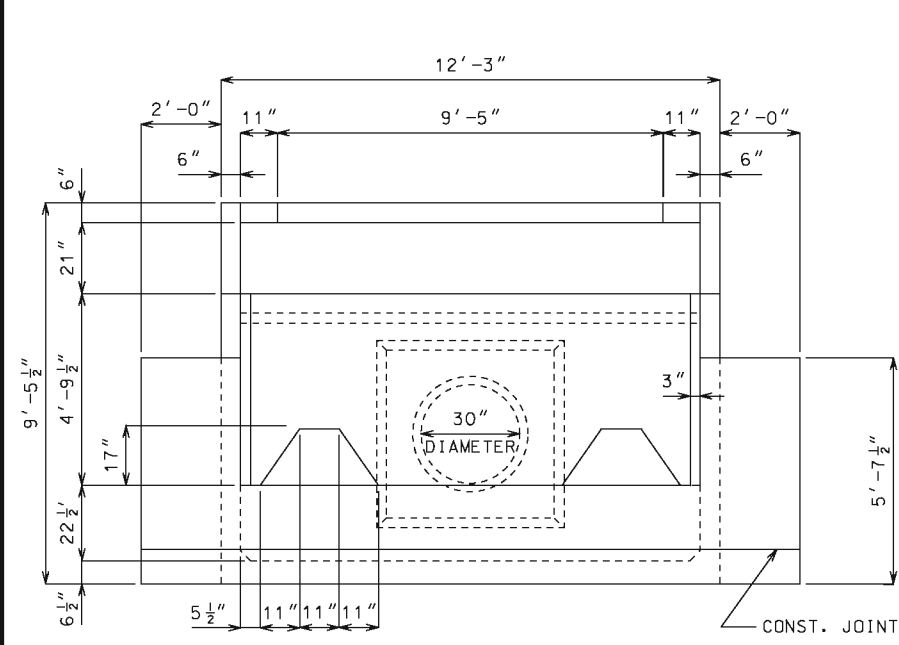
**PIPE CULVERT HEADWALL
ENERGY DISSIPATOR (IMPACT TYPE)
FOR 24" CONCRETE PIPE**

DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009

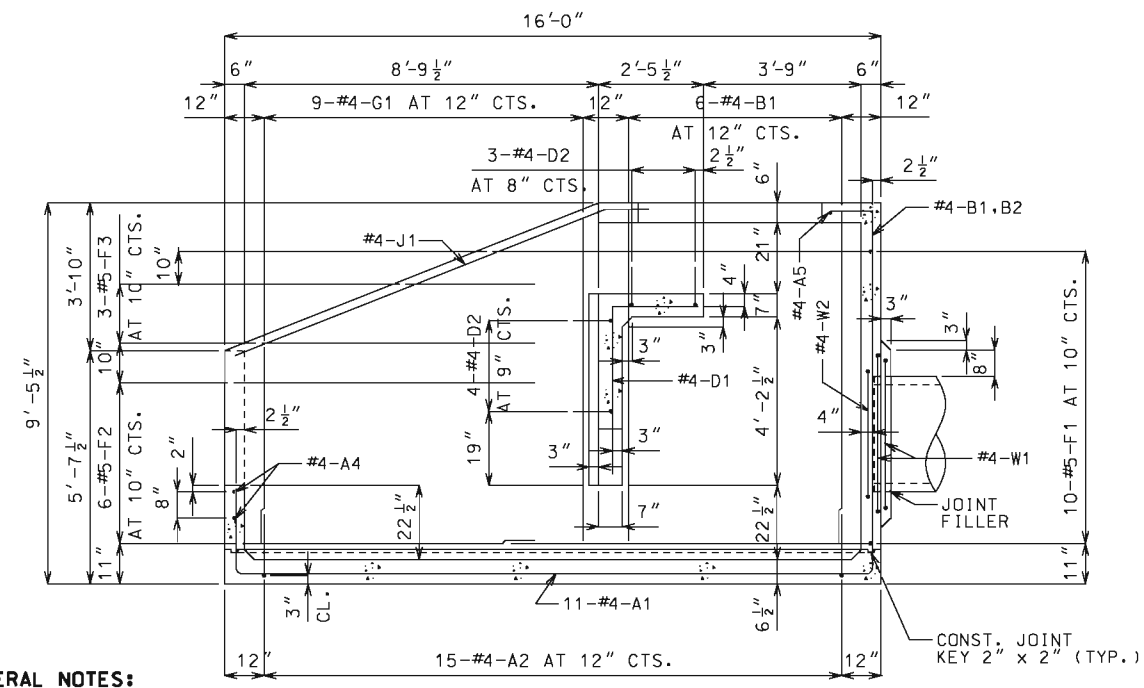
604.11E

SHEET NO.
1 OF 1

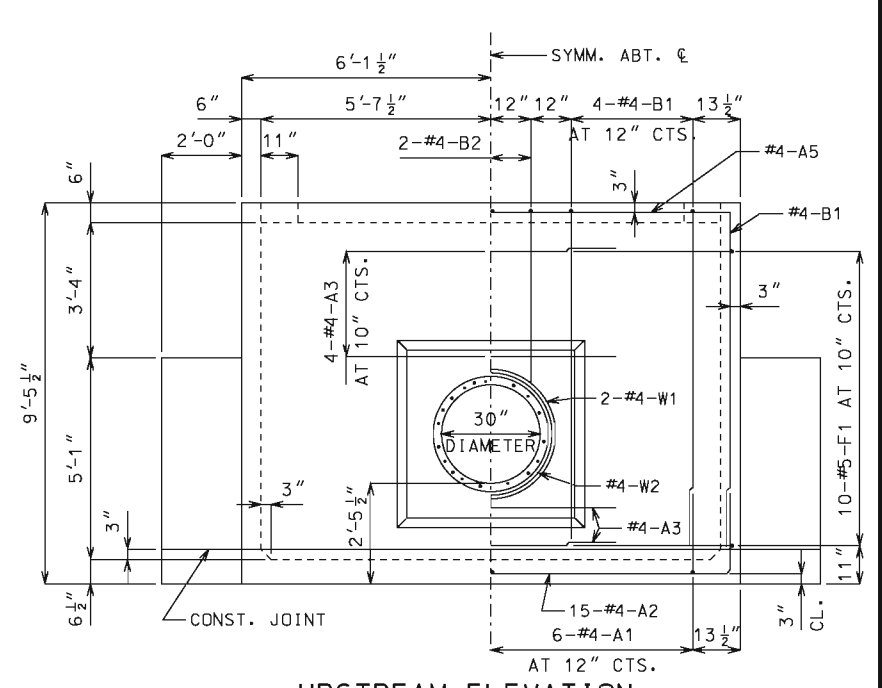
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION

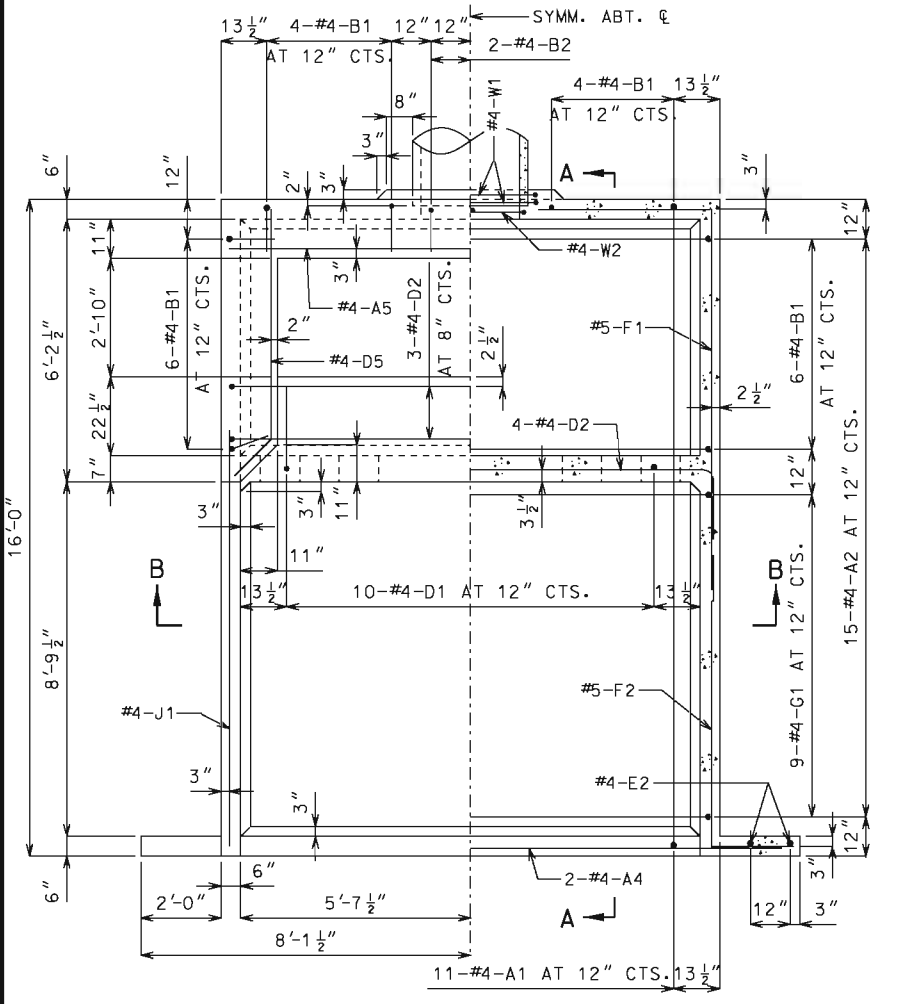


SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.



HALF PLAN HALF HORIZONTAL SECTION

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE $f'_c = 3,000$ psi
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ psi







REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL
SHALL BE $1\frac{1}{2}$ " UNLESS SHOWN OTHERWISE.

DIMENSIONS

DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

| ESTIMATED QUANTITIES | | |
|----------------------|---------|-------|
| ITEM | | TOTAL |
| CLASS B CONCRETE | CU. YD. | 13.2 |
| REINFORCING STEEL | LBS. | 1,170 |

| COMPLETE BILL OF REINFORCING STEEL | | | | | | | | | | | | | BENDING DIAGRAMS | | | | | |
|------------------------------------|-------|----------|-----------|------------|----------|------------|---------|-------------------------|---------|---------|---------|---------|------------------|----------------|---------------|---|---|---|
| NO. | REQ'D | MARK NO. | SHAPE NO. | VARIES (V) | NO. EACH | DIMENSIONS | | | | | | | | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT | | |
| | | | | | | B | C | D | E | F | H | K | | | | | | |
| | | SIZE | MARK | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | LBS. | | | |
| 11 | 4 | A1 | 11 | | | | 2-0½ | 15-6 | 0-20½ | | | | 19-3 | 19-1 | 140 |  |  |  |
| 15 | 4 | A2 | 11 | | | | 0-20½ | 11-10 | 0-20½ | | | | 15-3 | 15-1 | 151 | | | |
| 6 | 4 | A3 | 20 | | | | 5-4 | | | | | | 5-4 | 5-4 | 21 | | | |
| 2 | 4 | A4 | 20 | | | | 13-3 | | | | | | 13-3 | 13-3 | 18 | | | |
| 1 | 4 | A5 | 20 | | | | 11-9 | | | | | | 11-9 | 11-9 | 8 | | | |
| 20 | 4 | B1 | 19 | | | | 8-5½ | 0-13 | | | | | 9-7 | 9-5 | 126 |  |  |  |
| 3 | 4 | B2 | 19 | | | | 4-0 | 0-13 | | | | | 5-1 | 5-0 | 10 | | | |
| 10 | 4 | D1 | 19 | | | | 4-4 | 2-0½ | | | | | 6-5 | 6-3 | 42 | | | |
| 7 | 4 | D2 | 11 | | | | 0-12 | 11-10 | 0-12 | | | | 13-10 | 13-8 | 64 | | | |
| 1 | 4 | D3 | 15 | | | | 2-11 | 4-7 | 2-11 | 2-6 | 0-18 | 2-6 | 0-18 | 10-5 | 10-4 | 7 | | |
| 2 | 4 | D4 | 14 | | | | 0-12 | 0-7 | 3-0 | | 2-6 | 0-20 | 4-7 | 4-5 | 6 | | | |
| 2 | 4 | D5 | 23 | | | | 0-18⅞ | 5-7 | | | 0-13 | 0-13 | 7-1 | 7-1 | 9 | | | |
| 2 | 4 | E1 | 20 | | | | 3-0 | | | | | | 3-0 | 3-0 | 4 | | | |
| 4 | 4 | E2 | 20 | | | | 5-3 | | | | | | 5-3 | 5-3 | 14 | | | |
| 20 | 5 | F1 | 19 | | | | 8-8⅜ | 4-2½ | | | | | 12-11 | 12-9 | 266 | | | |
| 12 | 5 | F2 | 19 | | | | 2-1 | 8-1 | | | | | 10-2 | 10-1 | 126 | | | |
| 6 | 5 | F3 | 20 | V | 2 | | 3-0⅞ | | | | | | 3-1 | 3-1 | | | | |
| | | | | | | | 7-0⅞ | (INCREMENT = 24 INCHES) | | | | | | | 32 | | | |
| 18 | 4 | G1 | 20 | V | 2 | | 5-1⅜ | | | | | | 5-1 | 5-1 | | | | |
| | | | | | | | 8-5⅜ | (INCREMENT = 5 INCHES) | | | | | | | 81 | | | |
| 2 | 4 | J1 | 20 | | | | 10-11 | | | | | | 10-11 | 10-11 | 15 | | | |
| 2 | 4 | W1 | 16 | | | | 3-6 | | | | | | 11-10 | 11-10 | 16 | | | |
| 1 | 4 | W2 | 16 | | | | 2-11 | | | | | | 10-0 | 10-0 | 7 | | | |

SHAPE 11

SHAPE 14

SHAPE 15

SHAPE 16

SHAPE 19

SHAPE 20

SHAPE 23

90° STANDARD HOOKS

ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.

ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKE AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

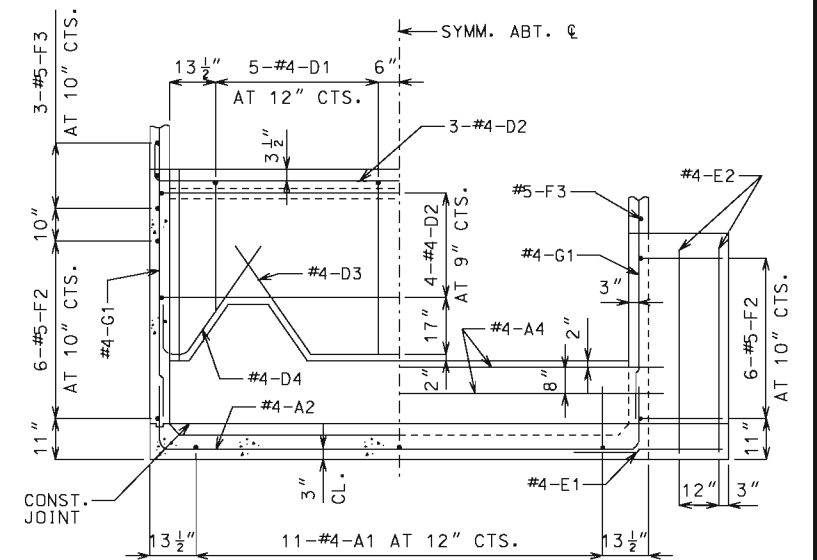
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF ELEVATION OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

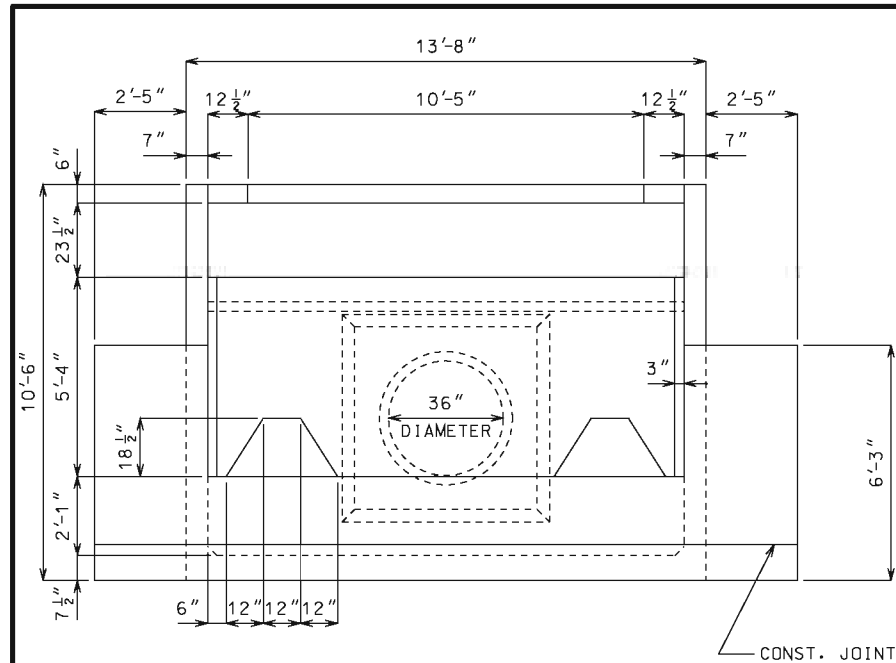
PIPE CULVERT HEADWALL
ENERGY DISSIPATOR (IMPACT TYPE)
FOR 30" CONCRETE PIPE

DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009

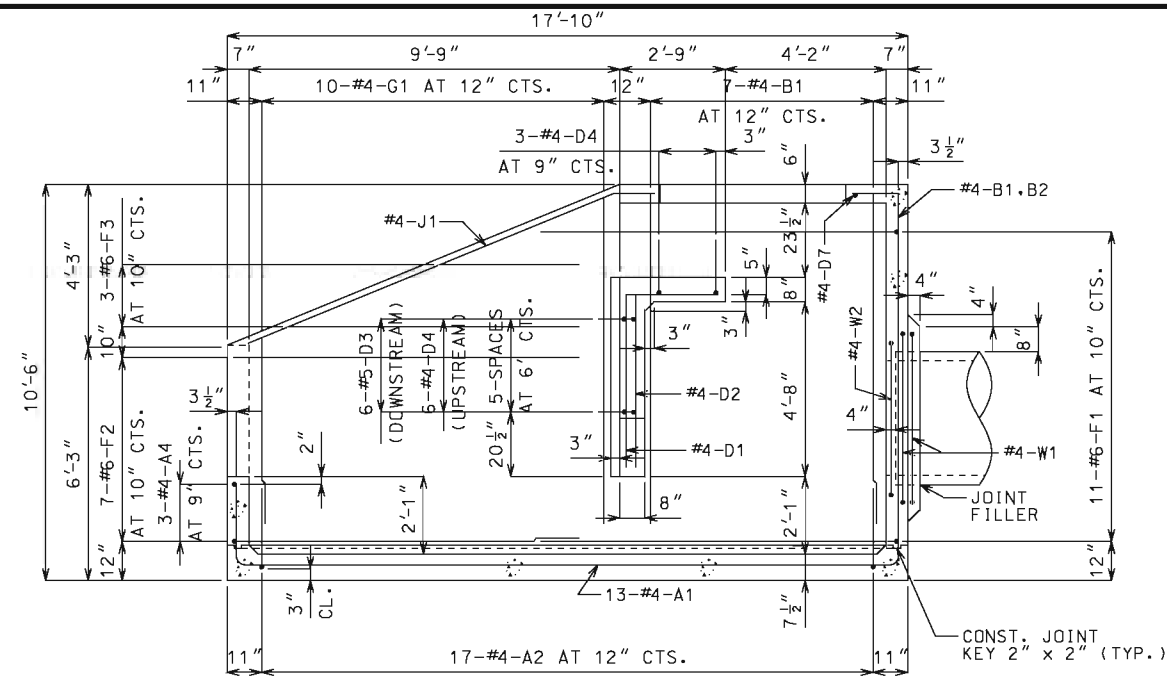
604.12E

SHEET NO.
1 OF 1

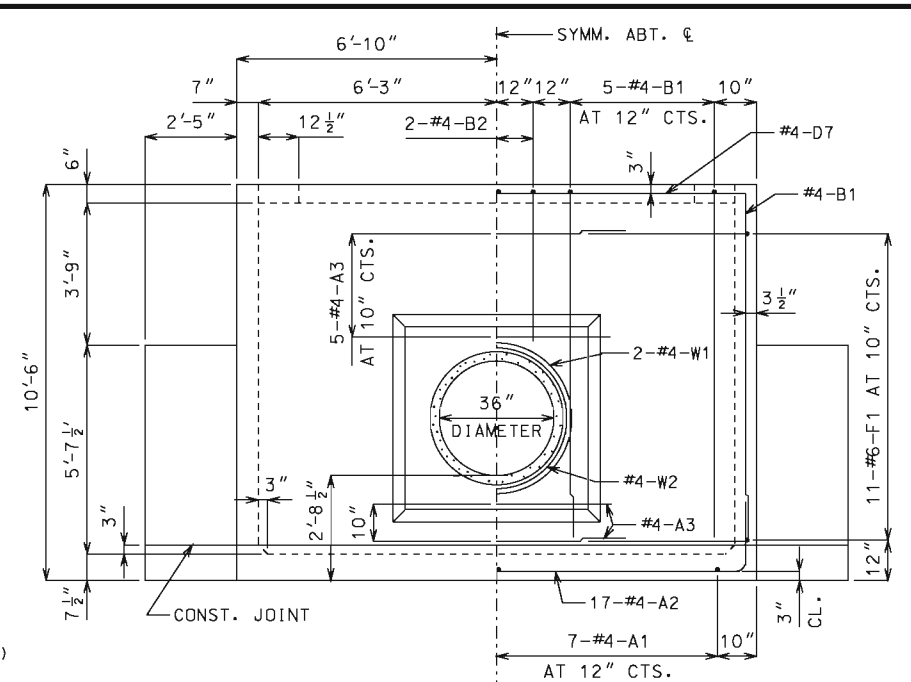
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



DOWNSTREAM ELEVATION



SECTION A - A



UPSTREAM ELEVATION

NOTE: BEND OR CUT A1 BARS IN FIELD TO CLEAR PIPE.

GENERAL NOTES:

DESIGN UNIT STRESSES

CLASS B CONCRETE $f'c = 3,000$ psi
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ psi

REINFORCING STEEL

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ " UNLESS SHOWN OTHERWISE.

DIMENSIONS

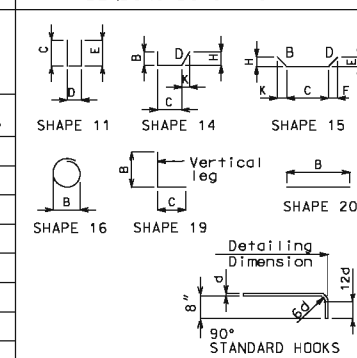
DRAWINGS ARE NOT TO SCALE. FOLLOW DIMENSIONS.

ESTIMATED QUANTITIES

| ITEM | CU. YD. | TOTAL |
|-------------------|---------|-------|
| CLASS B CONCRETE | 19.0 | |
| REINFORCING STEEL | 1,870 | |

| COMPLETE BILL OF REINFORCING STEEL | | | | | | | | | | | | | | | | |
|------------------------------------|-------|----------|-----------|------------|----------|------------|---------|---------------------------|---------|---------|---------|---------|---------|----------------|---------------|--------|
| NO. | REQ'D | MARK NO. | SHAPE NO. | VARIES (V) | NO. EACH | DIMENSIONS | | | | | | | | NOMINAL LENGTH | ACTUAL LENGTH | WEIGHT |
| | | | | | | B | C | D | E | F | H | K | | | | |
| | SIZE | MARK | | | | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | FT. IN. | LBS. | |
| 13 | 4 | A1 | 11 | | | | 2-2½ | 17-5½ | 2-4 | | | | 22-0 | 21-10 | 190 | |
| 17 | 4 | A2 | 11 | | | | 2-4 | 13-1 | 2-4 | | | | 17-9 | 17-7 | 200 | |
| 7 | 4 | A3 | 20 | | | | 5-11 | | | | | | 5-11 | 5-11 | 28 | |
| 3 | 4 | A4 | 20 | | | | 15-2 | | | | | | 15-2 | 15-2 | 30 | |
| 24 | 4 | B1 | 19 | | | | 8-7½ | 0-15 | | | | | 9-11 | 9-9 | 156 | |
| 3 | 4 | B2 | 19 | | | | 4-2½ | 0-15 | | | | | 5-6 | 5-4 | 11 | |
| 13 | 4 | D1 | 19 | | | | 4-11 | 2-5½ | | | | | 7-5 | 7-3 | 63 | |
| 13 | 4 | D2 | 20 | | | | 4-11 | | | | | | 4-11 | 4-11 | 43 | |
| 6 | 5 | D3 | 20 | | | | 13-5 | | | | | | 13-5 | 13-5 | 84 | |
| 9 | 4 | D4 | 11 | | | | 0-12 | 13-2 | 0-12 | | | | 15-2 | 15-0 | 90 | |
| 4 | 4 | D5 | 14 | | | | 0-12 | 0-8¾ | 3-0 | | | 2-6 | 0-20 | 4-7 | 12 | |
| 2 | 4 | D6 | 15 | | | | 3-0 | 5-4½ | 3-0 | 2-6 | 0-20 | 2-6 | 0-20 | 11-4 | 15 | |
| 1 | 4 | D7 | 20 | | | | 13-5 | | | | | | 13-5 | 13-5 | 9 | |
| 6 | 4 | E1 | 20 | | | | 6-0 | | | | | | 6-0 | 6-0 | 24 | |
| 2 | 4 | E2 | 15 | | | | 0-22⅝ | 6-0 | | | | 0-16 | 0-16 | 7-10 | 10 | |
| 2 | 4 | E3 | 20 | | | | 3-7 | | | | | | 3-7 | 3-7 | 5 | |
| 22 | 6 | F1 | 19 | | | | 9-10½ | 4-7½ | | | | | 14-6 | 14-4 | 474 | |
| 14 | 6 | F2 | 19 | | | | 9-2½ | 2-6½ | | | | | 11-9 | 11-7 | 244 | |
| 6 | 6 | F3 | 20 | V | 2 | | 3-6 | | | | | | 3-6 | 3-6 | | |
| | | | | | | | 7-6 | (INCREMENT = 24 INCHES) | | | | | | 7-6 | 7-6 | 50 |
| 20 | 4 | G1 | 20 | V | 2 | | 4-9 | | | | | | 4-9 | 4-9 | | |
| | | | | | | | 8-5½ | (INCREMENT = 5 INCHES) | | | | | | 8-6 | 8-6 | 89 |
| 2 | 4 | J1 | 20 | | | | 12-0 | | | | | | 12-0 | 12-0 | 16 | |
| 2 | 4 | W1 | 16 | | | | 4-0½ | | | | | | 13-7 | 13-7 | 18 | |
| 1 | 4 | W2 | 16 | | | | 3-4½ | | | | | | 11-6 | 11-6 | 8 | |

BENDING DIAGRAMS



ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STANDARD HOOKS.

HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.

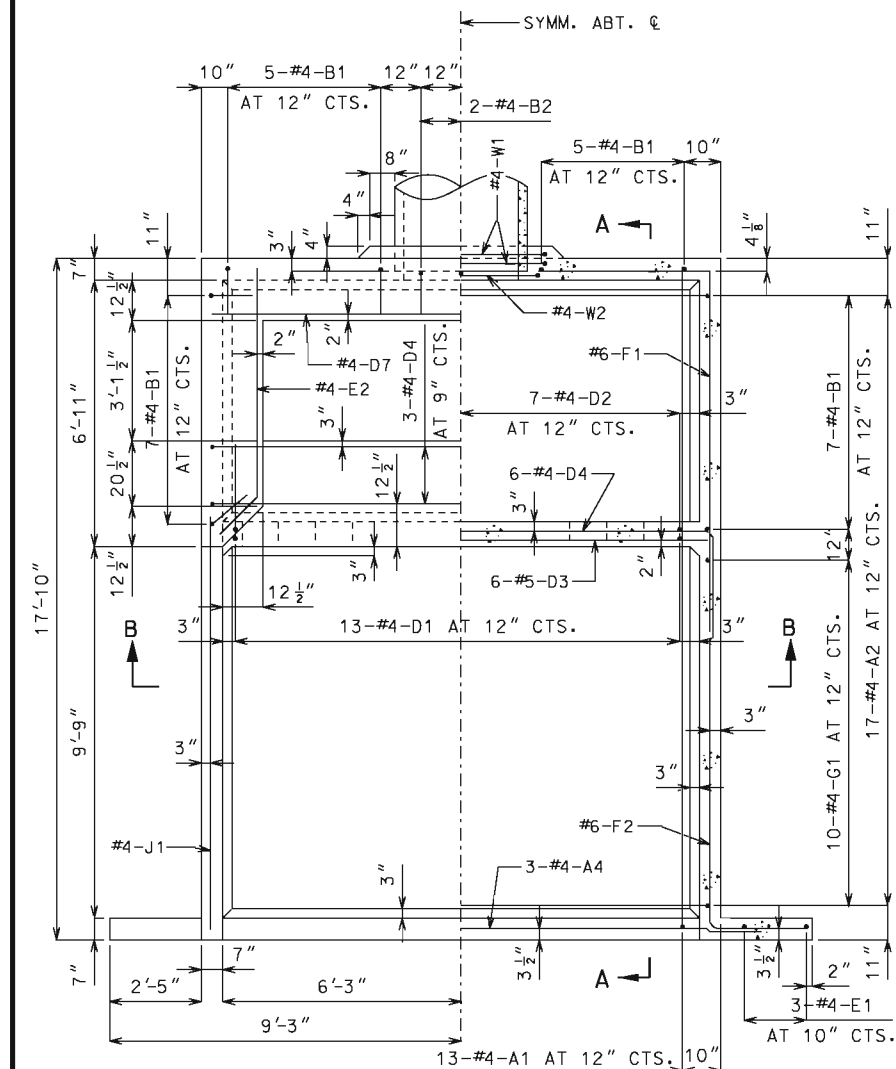
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAM AND ARE LISTED FOR FABRICATORS USE.

PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.

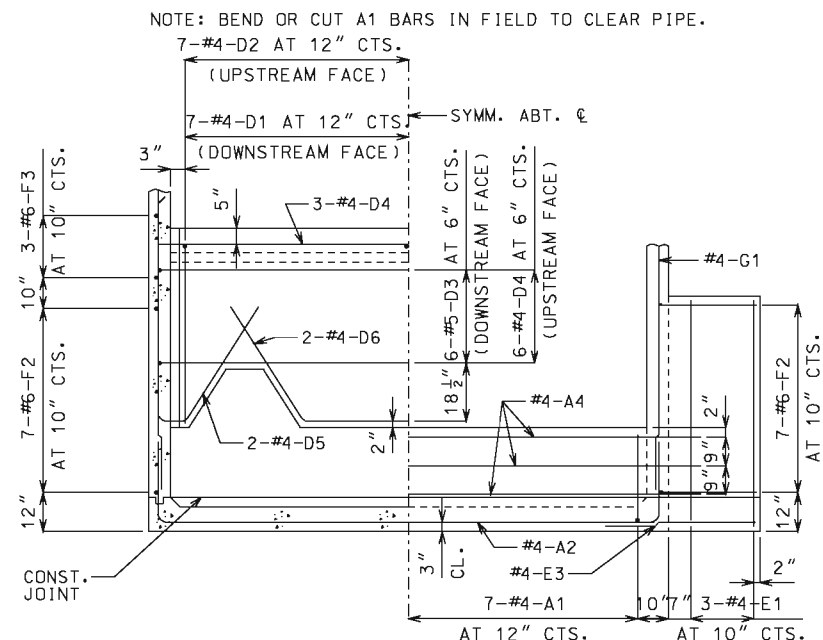
LENGTH = TOTAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.

V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

NO.EA. = NUMBER OF BARS OF EACH LENGTH.



HALF PLAN HALF HORIZONTAL SECTION



HALF SECTION B-B OF LOWER BAFFLE AND WING

NOTE: BEND OR CUT D1 AND D2 BARS IN FIELD TO CLEAR NOTCH IN BAFFLE WALL.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

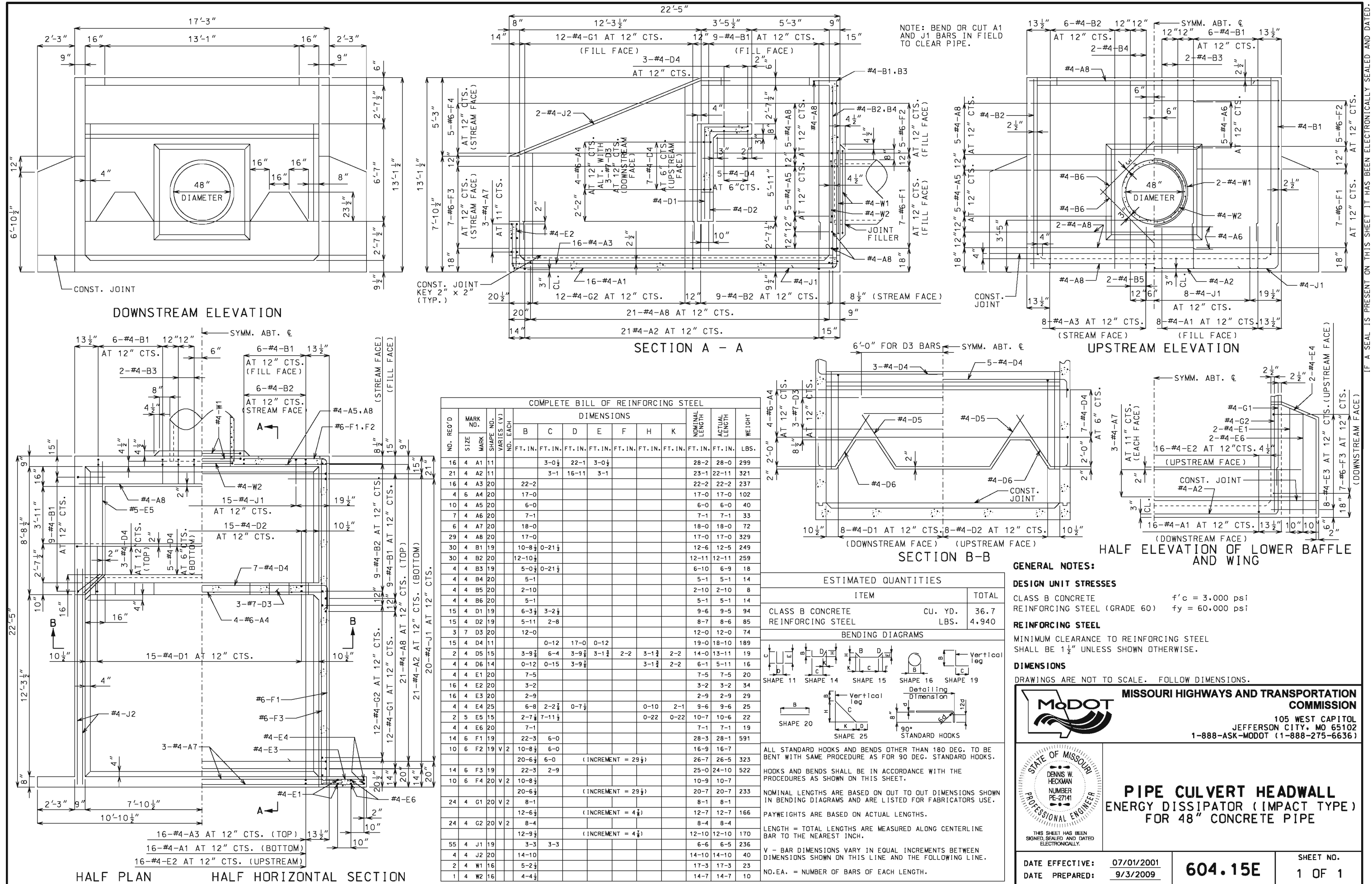
PIPE CULVERT HEADWALL
ENERGY DISSIPATOR (IMPACT TYPE)
FOR 36" CONCRETE PIPE

DATE EFFECTIVE: 07/01/2001
DATE PREPARED: 9/3/2009

604.13E

SHEET NO.
1 OF 1





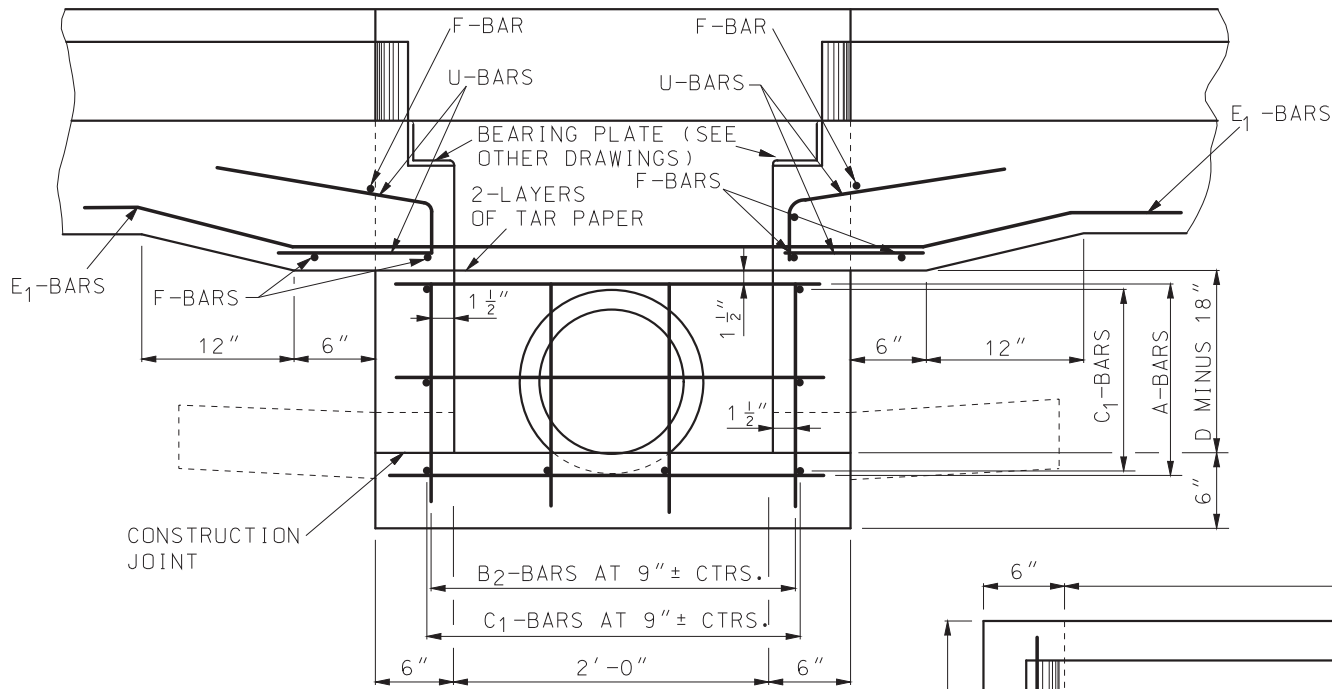
| BAR BILL - EXTENSION | | | | | | | |
|----------------------|------|-------|--------|-------|--------|-------|--------|
| LENGTH OF EXT. L | | 2'-6" | | 5'-0" | | 7'-6" | |
| MARK | SIZE | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH |
| G | #5 | 4 | 3'-3" | 7 | 3'-3" | 10 | 3'-3" |
| H ₁ | #4 | 4 | 2'-6" | 4 | 2'-6" | 4 | 2'-6" |
| H ₂ | #4 | 2 | 2'-9" | 3 | 2'-9" | 3 | 2'-9" |
| H ₃ | #4 | | | 2 | 3'-0" | 3 | 3'-0" |
| H ₄ | #4 | | | | | 2 | 3'-3" |
| H ₅ | #4 | 1 | 1'-0" | 1 | 1'-0" | 1 | 1'-0" |
| H ₆ | #4 | 2 | 1'-3" | 3 | 1'-3" | 3 | 1'-3" |
| H ₇ | #4 | | | 2 | 1'-6" | 3 | 1'-6" |
| H ₈ | #4 | | | | | 2 | 1'-9" |
| K | #4 | 7 | 1'-9" | 10 | 1'-9" | 13 | 1'-9" |
| L | #4 | 11 | 2'-9" | 11 | 5'-3" | 11 | 7'-9" |
| DOWEL BAR | #4 | 8 | 1'-0" | 9 | 1'-0" | 10 | 1'-0" |

| CU. YDS. & LBS. ADDITIONS TO BE MADE FOR EACH EXTENSION | | |
|---|----------|-------|
| LENGTH | CU. YDS. | LBS. |
| 2'-6" | 0.39 | 60.0 |
| 5'-0" | 0.70 | 101.4 |
| 7'-6" | 1.04 | 143.8 |

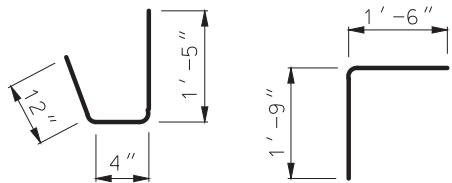
| CU. YDS. DEDUCTION TO BE MADE FOR PIPE OPENING | | | |
|--|------|------|------|
| 12" | 15" | 18" | 24" |
| 0.03 | 0.04 | 0.05 | 0.09 |

| CONCRETE AND STEEL DEDUCTIONS TO BE MADE FOR EACH EXTENSION OPENING | | |
|---|-----------|-----------|
| 9" X 12" | 12" X 12" | 15" X 12" |
| 0.01 C.Y. | 0.02 C.Y. | 0.02 C.Y. |
| 2.5 LBS. | 3.7 LBS. | 4.0 LBS. |

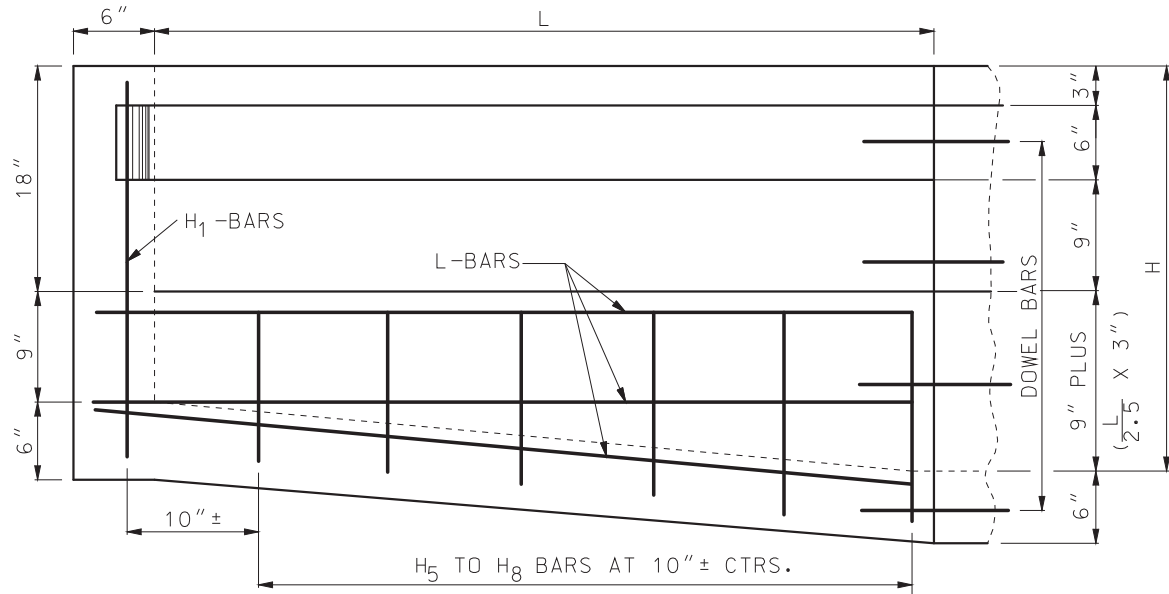
| BAR BILL - INTAKE BOX | | | | | | | | | | | | | | | | | | | | |
|---|----------------------|---------------|--|--------|-------------------------|--------|-------------------------|--------|---------------------------------------|-------------|------------------------------------|--------|------------------------------|--------|------------------------------|--------|----------------------------|--------|--------------|--------|
| D | CONC. CU. YDS. | STEEL LBS. | A-BARS | | B ₁ -BARS | | B ₂ -BARS | | C ₁ -BARS | | C ₂ -BARS | | E ₁ -BARS | | E ₂ -BARS | | F-BARS | | U-BARS | |
| | | | TRANSVERSE IN BOTTOM WALLS & TOP | | VERTICAL IN WALLS | | VERTICAL IN WALLS | | LONGITUDINAL IN BOTTOM AND SIDE | | LONGITUDINAL IN SIDE AND TOP | | LONGITUDINAL IN GUTTER | | LONGITUDINAL IN GUTTER | | TRANSVERSE IN GUTTER | | IN GUTTER | |
| | | | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH |
| 2'-6" | 0.82 | 131 | 15 | 2'-9" | 8 | 2'-9" | 10 | 1'-3" | 8 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 2'-9" | 0.88 | 134 | 15 | 2'-9" | 8 | 3'-0" | 10 | 1'-6" | 8 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 3'-0" | 0.94 | 137 | 15 | 2'-9" | 8 | 3'-3" | 10 | 1'-9" | 8 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 3'-3" | 1.00 | 140 | 15 | 2'-9" | 8 | 3'-6" | 10 | 2'-0" | 8 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 3'-6" | 1.06 | 152 | 17 | 2'-9" | 8 | 3'-9" | 10 | 2'-3" | 10 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 3'-9" | 1.12 | 155 | 17 | 2'-9" | 8 | 4'-0" | 10 | 2'-6" | 10 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 4'-0" | 1.18 | 158 | 17 | 2'-9" | 8 | 4'-3" | 10 | 2'-9" | 10 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 4'-3" | 1.24 | 170 | 19 | 2'-9" | 8 | 4'-6" | 10 | 3'-0" | 12 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 4'-6" | 1.30 | 173 | 19 | 2'-9" | 8 | 4'-9" | 10 | 3'-3" | 12 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 4'-9" | 1.36 | 176 | 19 | 2'-9" | 8 | 5'-0" | 10 | 3'-6" | 12 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| 5'-0" | 1.42 | 189 | 21 | 2'-9" | 8 | 5'-3" | 10 | 3'-9" | 14 | 4'-3" | 6 | 1'-3" | 5 | 7'-0" | 1 | 4'-9" | 6 | 2'-9" | 8 | 2'-9" |
| CONCRETE QUANTITIES INCLUDE 0.15 CU.YDS. FOR INVERT | | | | | | | | | | ALL BARS #4 | | | | | | | | | | |



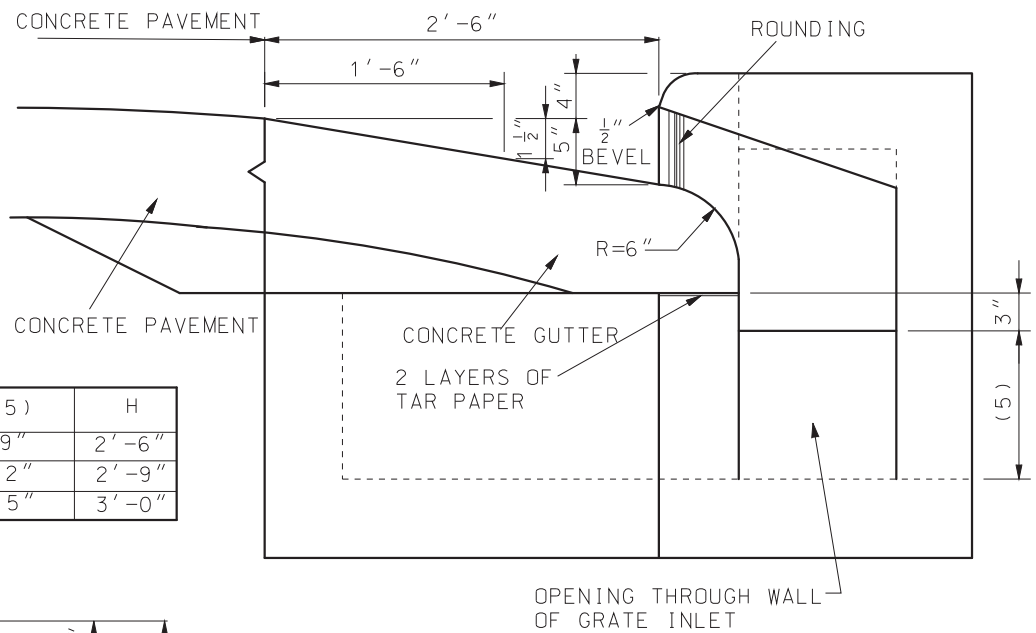
SECTION B-B



U-BARS
BENDING DIAGRAMS
G-BARS




LONGITUDINAL SECTION
(EXTENSION)



SECTION SHOWING DETAILS OF OPENING AND
DEPRESSION IN PAVEMENT OR GUTTER

| L | (5) | H |
|-------|-----|-------|
| 2'-6" | 9" | 2'-6" |
| 5'-0" | 12" | 2'-9" |
| 7'-6" | 15" | 3'-0" |



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER
PE-28411

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

DROP INLET

TYPE X

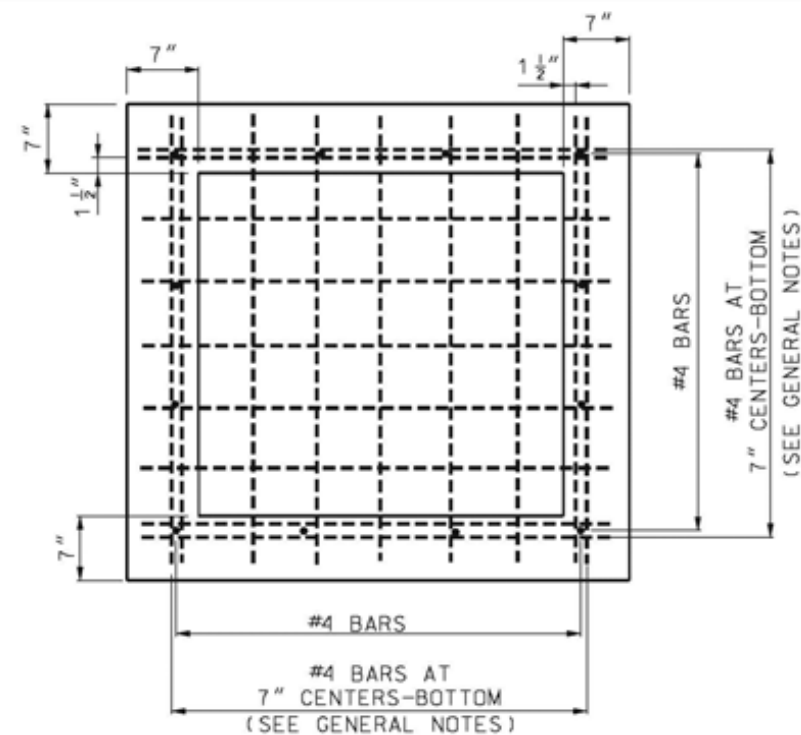
DATE EFFECTIVE: 04/01/1983

DATE PREPARED: 2/9/2018

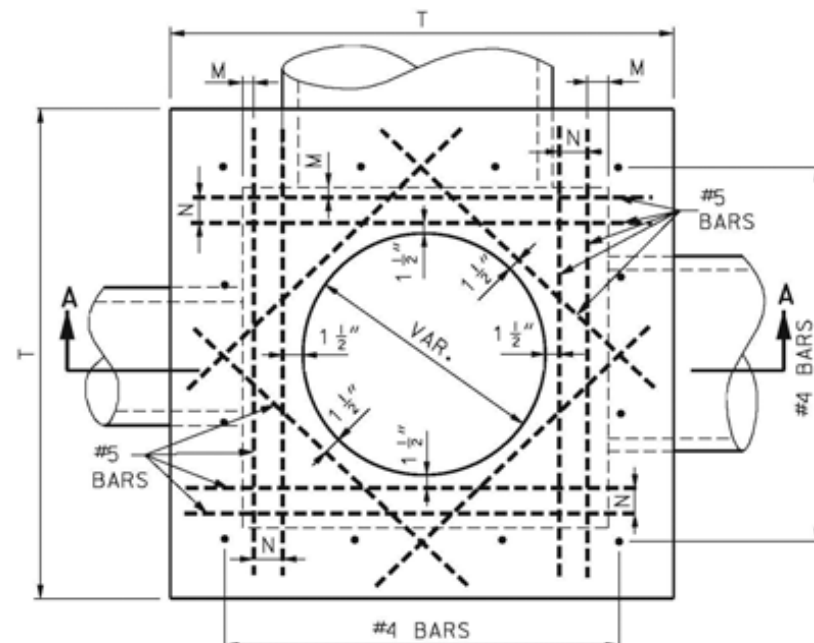
604.29C

SHEET NO.
2 OF 2

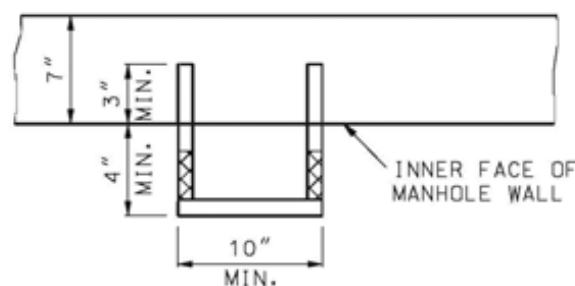
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BASE PLAN



PLAN VIEW

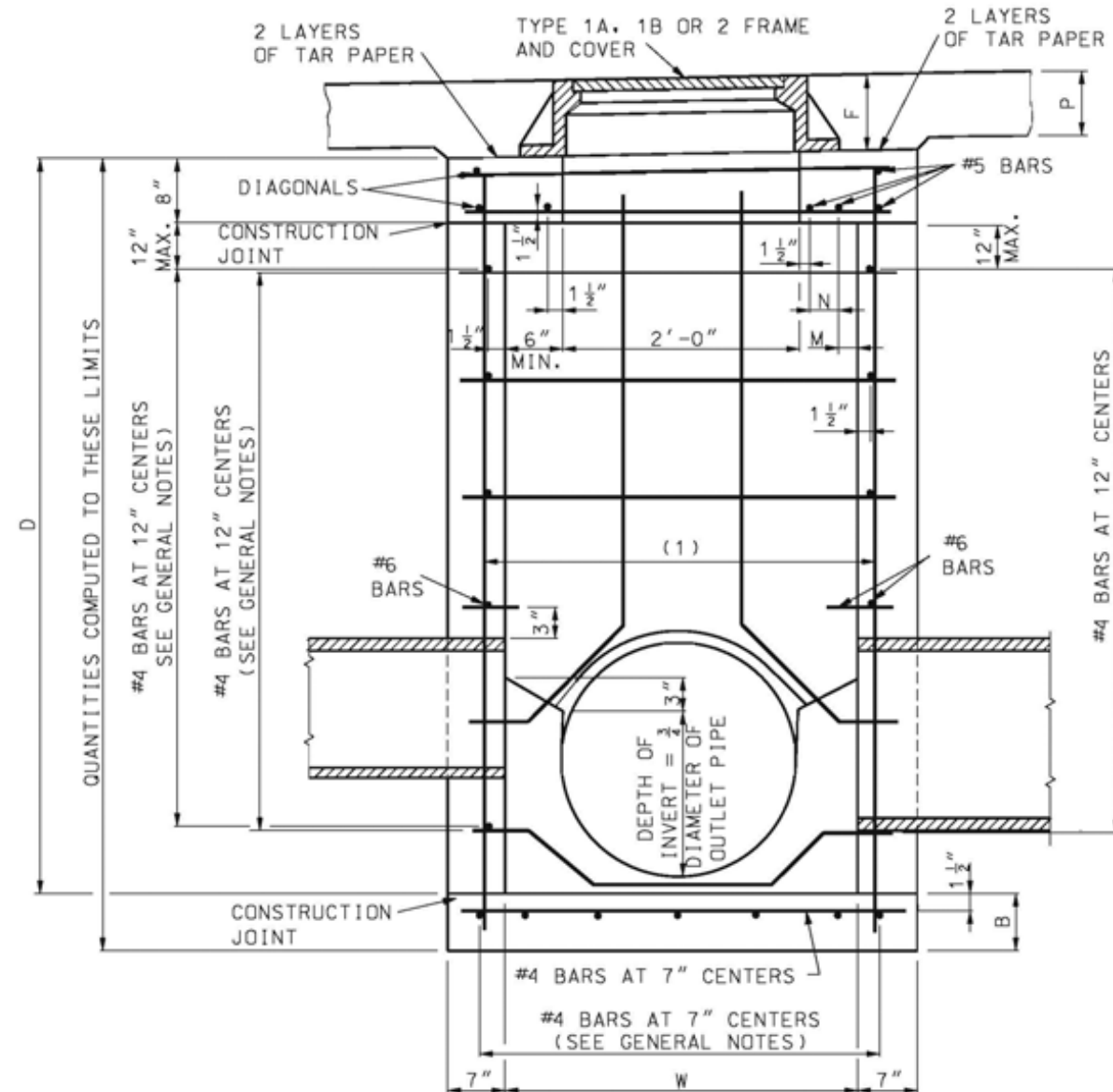


STEP INSTALLATION

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'-0". STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE SET LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.



SECTION A-A

MANHOLE FRAME AND COVER IN PAVED AREAS USE TYPE 1. IN UNPAVED AREAS USED TYPE 1A OR 1B. NO CHANGE IN QUANTITIES REQUIRED FOR FRAME AND COVER DETAILS. SEE OTHER DRAWINGS.

- (1) 4-#4 FOR 3'-0" OPENING
5-#4 FOR 3'-6" & 4'-0"
6-#4 FOR 4'-6" & 5'-0"

GENERAL NOTES:

THE MAXIMUM DEPTH OF MANHOLE USING #4 HORIZONTAL BARS AT 12" CENTERS IS 20'.

OVER 20' DEPTH, HORIZONTAL BARS SHALL BE INCREASED TO A #5 BAR AT 10" CENTERS TO A MAXIMUM DEPTH OF 30'.

OVER 30' DEPTH WILL REQUIRE A SPECIAL DESIGN.

BOTTOM STEEL AT MORE THAN 20' DEPTH TO A MAXIMUM DEPTH OF 30' IS INCREASED TO #6 BARS AT 7" CENTERS.

| VARIABLE DIMENSIONS | | | | | |
|---------------------|-------|-------|----|----------|-------|
| SIZE OF PIPE | W | T | B | M | N |
| ≤ 24" | 3'-0" | 4'-2" | 7" | VARIABLE | 2 ½" |
| 30" | 3'-6" | 4'-8" | 7" | | 5 ½" |
| 36" | 4'-0" | 5'-2" | 7" | | 8" |
| 42" | 4'-6" | 5'-8" | 8" | | 5 ½"* |
| 48" | 5'-0" | 6'-2" | 8" | | 7"* |
| * 4-#5 BARS ADDED | | | | | |

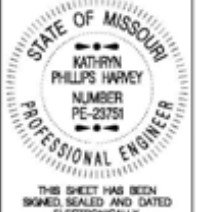
NOTES:
MINIMUM "D" SHALL BE THE OUTSIDE DIAMETER OF LARGEST PIPE ENTERING MANHOLE PLUS 16" CARRIED TO THE NEAREST 3".

HORIZONTAL AND VERTICAL BARS HORIZONTAL AND VERTICAL BARS AROUND PIPES.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE MANHOLES

DATE EFFECTIVE: 02-01-2009
DATE PREPARED: 8/26/2009

604.30G

SHEET NO.
1 OF 2

| FOR PIPE OPENINGS | | | | | | | | |
|--|------------|------|------|-------|-------|-------|-------|-------|
| | PIPE SIZES | | | | | | | |
| | 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" |
| CUBIC YARDS CONCRETE TO DEDUCT | 0.03 | 0.04 | 0.06 | 0.11 | 0.16 | 0.23 | 0.31 | 0.40 |
| ADDITIONAL STEEL REQUIRED FOR PIPE OPENING | | | | | | | | |
| WIDTH OF WALL REQUIRED FOR PIPE | | | | 3'-0" | 3'-6" | 4'-0" | 4'-6" | 5'-0" |
| LENGTH OF #6 BAR REQUIRED | | | | 4'-0" | 4'-6" | 5'-0" | 5'-6" | 6'-0" |
| WEIGHT OF BAR LBS. | | | | 6.0 | 6.8 | 7.5 | 8.3 | 9.0 |

NOTE:
CONCRETE QUANTITIES IN TABLE INCLUDE INVERT. THE QUANTITY OF STEEL FOR 3" OF "D" IS NOT ¼ OF THAT FOR 1 FOOT OF "D". NEITHER IS THE QUANTITY FOR 6" OF "D" EQUAL TO ½ THAT FOR 1 FOOT OF "D". SO USE QUANTITY IN 1 FOOT COLUMN FOR FULL FEET AND IN 3" COLUMN FOR FRACTIONAL FEET.

| QUANTITIES | | | | | | | | |
|---------------|---|----------------------------|----------|--------------------------|-------|--------------------------------|-------|---|
| | | TO AND INCLUDING 20' DEPTH | | | | 20' TO AND INCLUDING 30' DEPTH | | |
| SIZE (W) | | D= 3'-3" | D= 4'-3" | ADD OR SUBTRACT FOR EACH | | ADD OR SUBTRACT FOR EACH | | ADDITIONAL STEEL IN BOTTOM DIFFERENCE IN #4 AND #6 BARS |
| | | | | 1 FT. | 3 IN. | 1 FT. | 3 IN. | |
| 3'-0" X 3'-0" | C | 1.62 | 1.93 | 0.31 | 0.08 | 0.31 | 0.08 | 30.14 |
| | S | 157.90 | 176.80 | 18.60 | 2.00 | 20.64 | 5.16 | |
| 3'-0" X 3'-6" | C | 1.77 | 2.11 | 0.33 | 0.08 | 0.33 | 0.08 | 34.85 |
| | S | 173.80 | 194.60 | 20.60 | 2.30 | 23.12 | 5.78 | |
| 3'-0" X 4'-0" | C | 1.93 | 2.28 | 0.35 | 0.09 | 0.35 | 0.09 | 39.56 |
| | S | 187.10 | 208.60 | 21.30 | 2.30 | 24.27 | 6.07 | |
| 3'-0" X 4'-6" | C | 2.16 | 2.53 | 0.38 | 0.09 | 0.38 | 0.09 | 44.26 |
| | S | 211.20 | 234.70 | 23.30 | 2.70 | 26.75 | 6.69 | |
| 3'-0" X 5'-0" | C | 2.32 | 2.71 | 0.40 | 0.10 | 0.40 | 0.10 | 48.97 |
| | S | 219.60 | 243.80 | 24.00 | 2.70 | 27.90 | 6.97 | |
| 3'-6" X 3'-6" | C | 1.94 | 2.29 | 0.35 | 0.09 | 0.35 | 0.09 | 40.27 |
| | S | 192.40 | 215.10 | 22.70 | 2.70 | 25.60 | 6.40 | |
| 3'-6" X 4'-0" | C | 2.10 | 2.48 | 0.38 | 0.09 | 0.38 | 0.09 | 45.69 |
| | S | 204.30 | 227.70 | 23.40 | 2.70 | 26.75 | 6.69 | |
| 3'-6" X 4'-6" | C | 2.35 | 2.75 | 0.40 | 0.10 | 0.40 | 0.10 | 51.11 |
| | S | 230.00 | 255.50 | 25.30 | 3.00 | 29.23 | 7.31 | |
| 3'-6" X 5'-0" | C | 2.53 | 2.95 | 0.42 | 0.10 | 0.42 | 0.10 | 56.53 |
| | S | 240.90 | 267.10 | 26.00 | 3.00 | 30.38 | 7.60 | |
| 4'-0" X 4'-0" | C | 2.28 | 2.68 | 0.40 | 0.10 | 0.40 | 0.10 | 51.83 |
| | S | 216.70 | 240.80 | 24.10 | 2.70 | 27.90 | 6.97 | |
| 4'-0" X 4'-6" | C | 2.55 | 2.97 | 0.42 | 0.10 | 0.42 | 0.10 | 57.96 |
| | S | 246.40 | 272.60 | 26.00 | 3.00 | 30.38 | 7.60 | |
| 4'-0" X 5'-0" | C | 2.74 | 3.18 | 0.44 | 0.11 | 0.44 | 0.11 | 64.10 |
| | S | 255.60 | 282.50 | 26.70 | 3.00 | 31.53 | 7.88 | |
| 4'-6" X 4'-6" | C | 2.75 | 3.19 | 0.44 | 0.11 | 0.44 | 0.11 | 64.81 |
| | S | 276.80 | 304.90 | 28.00 | 3.30 | 32.86 | 8.22 | |
| 4'-6" X 5'-0" | C | 2.94 | 3.41 | 0.46 | 0.12 | 0.46 | 0.12 | 71.66 |
| | S | 289.40 | 318.20 | 28.70 | 3.30 | 34.01 | 8.50 | |
| 5'-0" X 5'-0" | C | 3.15 | 3.64 | 0.48 | 0.12 | 0.48 | 0.12 | 79.23 |
| | S | 299.80 | 329.30 | 29.40 | 3.30 | 35.16 | 8.79 | |

TO AND INCLUDING 20-FOOT DEPTH

NOTE:
TO COMPUTE THE QUANTITIES FOR DEPTHS ("D") NOT SHOWN, REFER TO TABLE FOR THE SIZE OF MANHOLE REQUIRED. SUBTRACT THE "D" VALUE FROM THE TABLE AND THE "D" VALUE FROM THE PLANS. MULTIPLY THE VALUES SHOWN IN THE 1-FOOT COLUMN FROM THE TABLE WITH THE FULL ONE FOOT INCREMENTS FROM THE DIFFERENCE BETWEEN THE "D" FROM THE PLANS AND THE "D" FROM THE TABLE. MULTIPLY THE VALUES SHOWN IN THE 3" COLUMN FROM THE TABLE WITH THE REMAINING FRACTIONAL FOOT VALUES PER 3" INCREMENTS. FOLLOW THIS SAME PROCESS FOR THE STEEL CALCULATIONS. SEE THE EXPAMPLE BELOW:

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 6'-9" "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:
"D" REQUIRED = 6'-9"
"D" GIVEN IN TABLE = 4'-3"
"D" ADDITIONAL = 2'-6"

| | | | |
|--|-------|----------|-------|
| | 2.76 | CONCRETE | STEEL |
| FROM TABLE FOR 4'-3" "D" | 2.28 | 208.6 | |
| ADD (2 X QUANTITIES FOR 1-FOOT) | 0.70 | 42.6 | |
| ADD (6" = 2 X 3") (2 X QUANTITIES FOR 3") | 0.18 | 255.8 | |
| SUBTOTAL | 3.16 | 255.8 | |
| ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL) | -0.40 | +19.5 | |
| TOTAL | 2.76 | 275.3 | |
| USE | 2.80 | 280.0 | |

MORE THAN 20-FOOT TO AND INCLUDING 30-FOOT DEPTH

FIRST, COMPUTE QUANTITIES FOR 20-FOOT DEPTH FROM THE TABLE "TO AND INCLUDING 20-FOOT DEPTHS".

FOR EXAMPLE: QUANTITIES FOR 3'-0" X 4'-0" MANHOLE WITH 20'-0", "D" HAVING ONE 18", ONE 24" AND ONE 36" PIPE OPENINGS ARE DETERMINED AS FOLLOWS:


"D" REQUIRED = 20'-0"
"D" GIVEN IN TABLE = 4'-3"
"D" ADDITIONAL = 15'-9"

| | | |
|--|----------|-------|
| | CONCRETE | STEEL |
| FROM TABLE FOR 4'-3" "D" | 2.28 | 208.6 |
| ADD (15 X QUANTITIES FOR 1-FOOT) | 5.25 | 319.9 |
| ADD (9" = 3 X 3") (3 X QUANTITIES FOR 3") | 0.27 | 6.9 |
| SUBTOTAL | 7.80 | 535.0 |
| ADJUST QUANTITIES FOR THE PIPE OPENINGS (DEDUCT CONCRETE AND ADD STEEL FOR TWO 3' AND ONE 4' WALL) | -0.40 | +19.5 |
| TOTAL | 7.40 | 554.5 |

SECOND, COMPUTE QUANTITIES FOR THE DEPTHS BEYOND 20 FEET TO A MAXIMUM OF 30 FEET, USING THE TABLE "20-FOOT TO AND INCLUDING 30-FOOT DEPTH", AND ADD TO THE QUANTITIES FOR 20-FOOT DEPTH. ALSO, ADD THE DIFFERENCE IN STEEL IN THE BOTTOM DUE TO THE INCREASE IN SIZE OF BARS FROM #4 TO #6 BARS ON 7-INCH CENTERS.


FOR EXAMPLE:
"D" REQUIRED = 30'-0"
"D" COMPUTED = 20'-0"
"D" ADDITIONAL = 10'-0"

| | | |
|---|----------|--------|
| | CONCRETE | STEEL |
| ADD CONCRETE (10 X QUANTITIES FOR 1-FOOT) | 3.50 | |
| ADD STEEL (10 X QUANTITIES FOR 1-FOOT) | 242.70 | |
| ADD STEEL (ADDITIONAL STEEL IN BOTTOM) | | 39.56 |
| TOTAL (30-FOOT DEPTH) | 10.90 | 836.76 |
| USE | 10.9 | 840.0 |



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

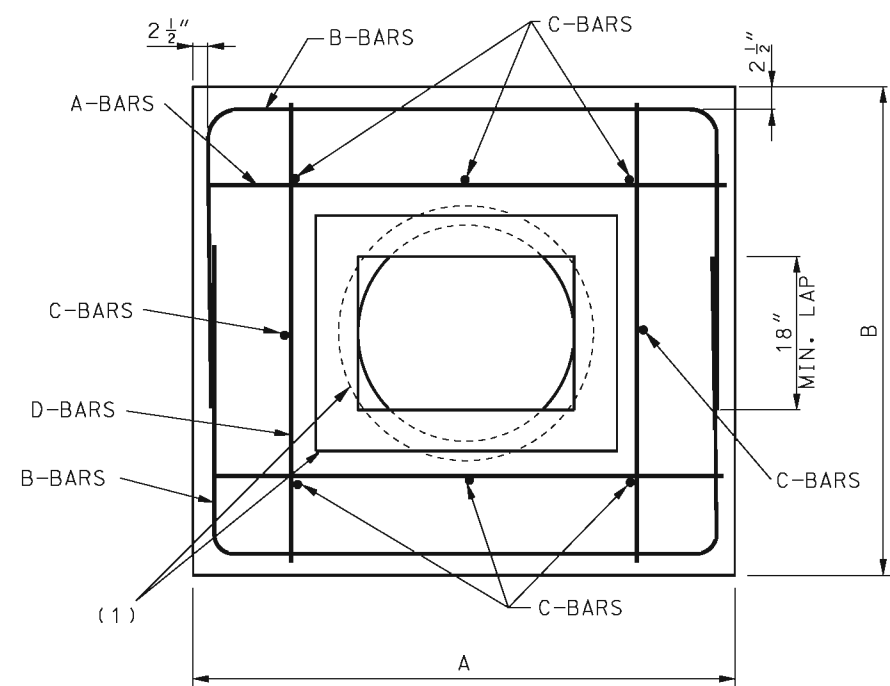
CONCRETE MANHOLES

DATE EFFECTIVE: 02-01-2009
DATE PREPARED: 8/26/2009

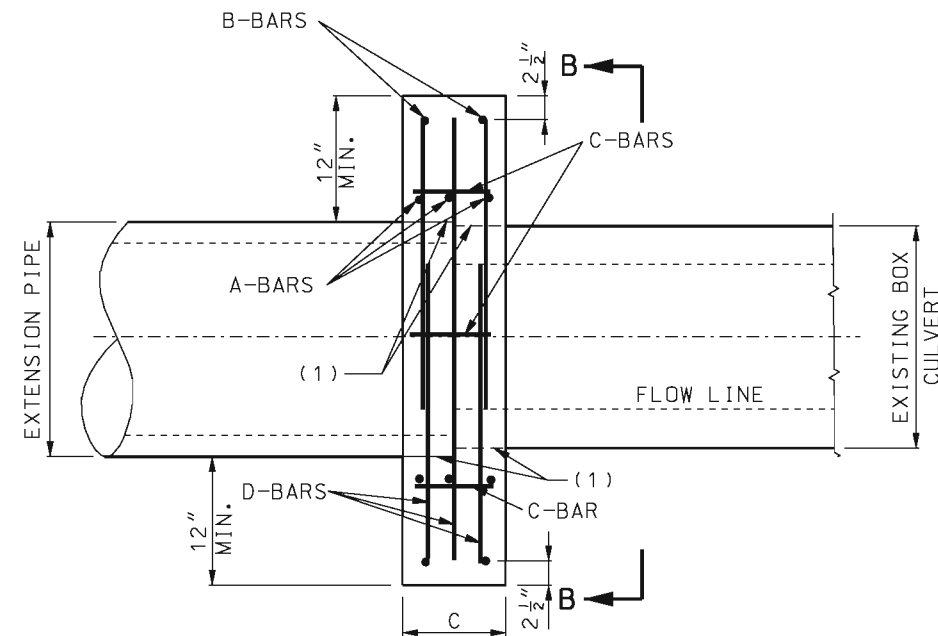
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SHEET NO.
2 OF 2

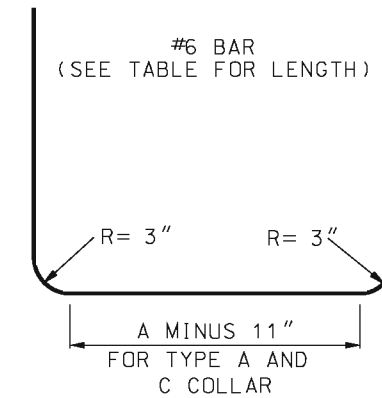
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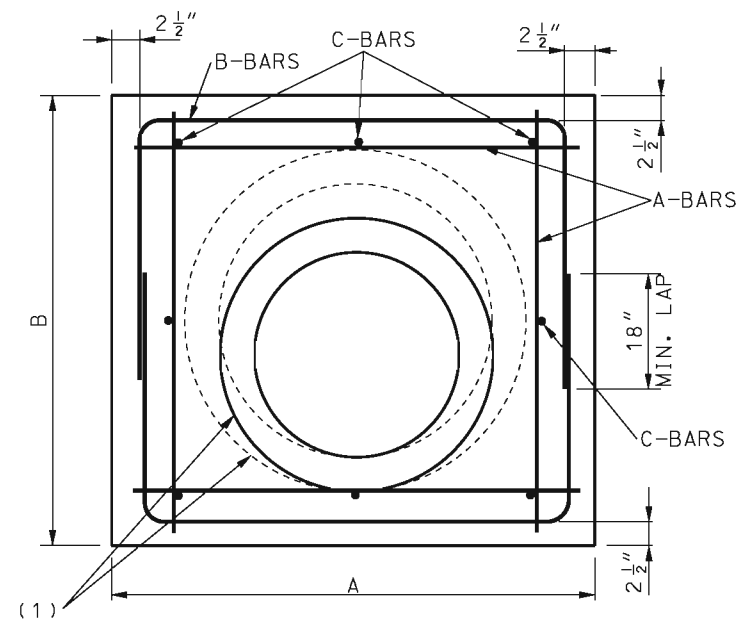
SECTION B-B



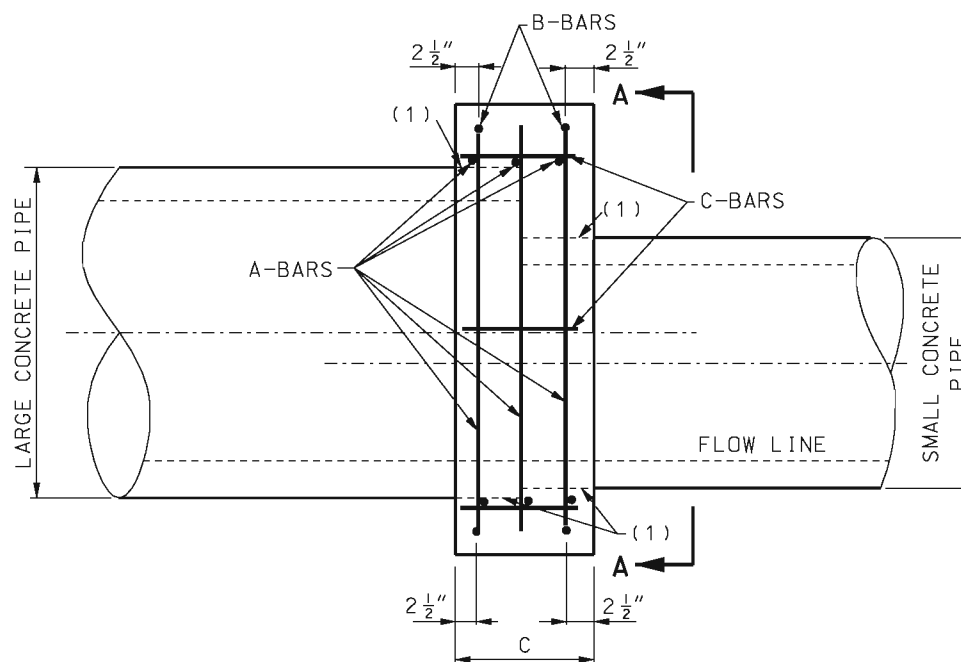
ELEVATION
(FOR BOX CULVERT TO PIPE)



BENDING DIAGRAM FOR B-BARS



SECTION A-A


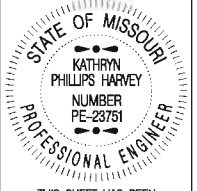


ELEVATION
(FOR CONCRETE PIPE
TO CONCRETE PIPE)

(1) ONE LAYER COMMERCIALY AVAILABLE
55-POUND ROLL ROOFING.

TYPE C COLLAR

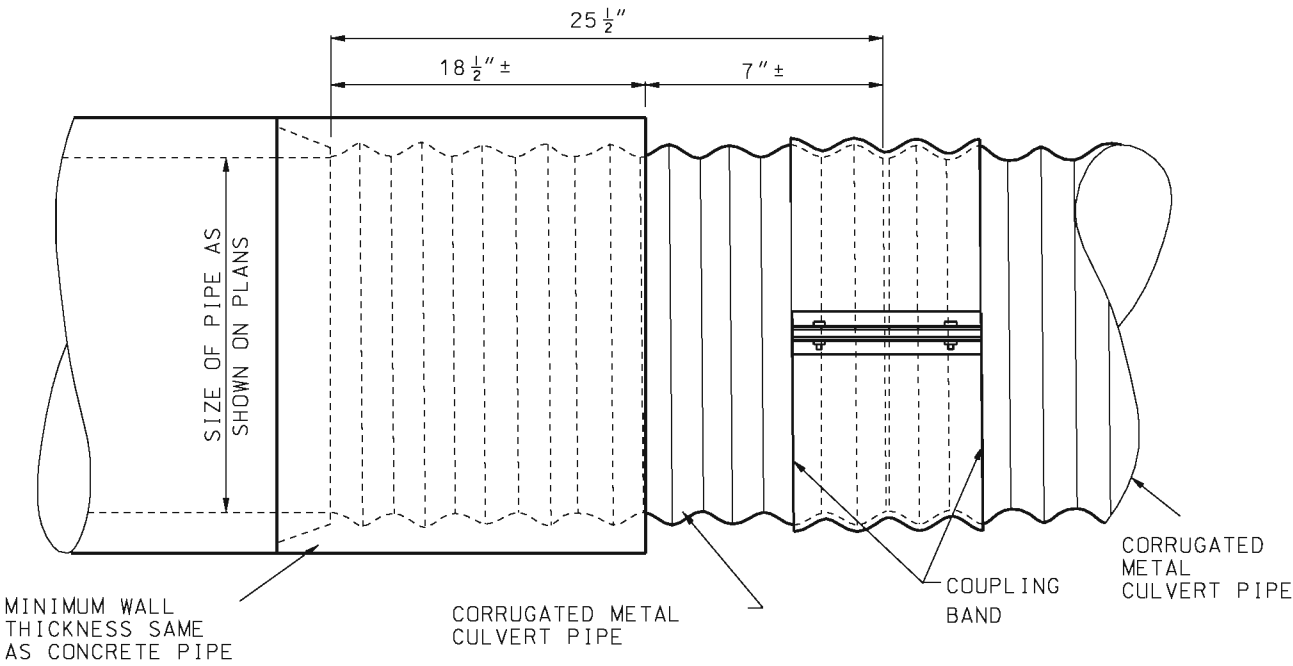
TYPE A COLLAR

| | |
|--|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PIPE COLLARS |
| DATE EFFECTIVE: 10/01/2000 DATE PREPARED: 8/21/2009 | 604.40F |
| SHEET NO. 1 OF 2 | |

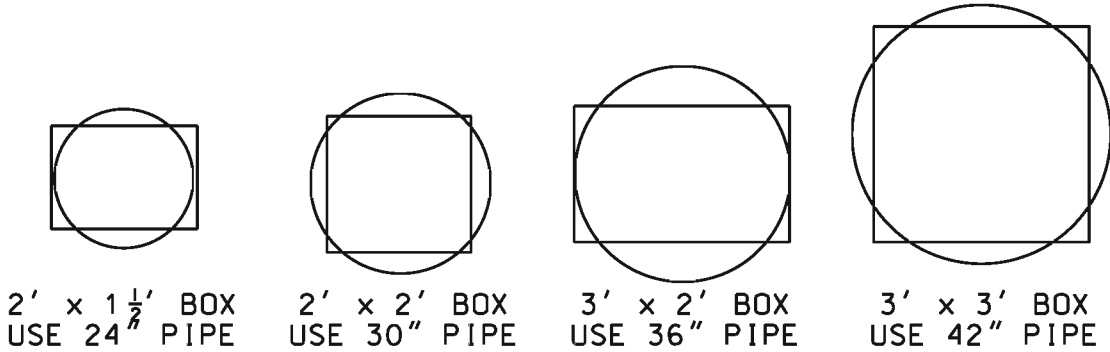
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| TABLE OF DIMENSIONS | | | | | | | | |
|---------------------|----------------|-----------------|-------------|---------------------------------|--------------------------------|--------------------------------|----------------------|--------------|
| SIZE OF PIPE | | DIMENSIONS | | LENGTH OF BARS | | | QUANTITIES | |
| LARGE (IN.) | SMALL (IN.) | A & B (FT.-IN.) | C (FT.-IN.) | A (#5) 12 REQUIRED (FT.-IN.) | B (#6) 4 REQUIRED (FT.-IN.) | C (#4) 8 REQUIRED (FT.-IN.) | CONCRETE (CU. YD.) | STEEL (LBS.) |
| 12 | 12 | 2-8 | 1-0 | 2-5 | 5-10 | 0-9 | 0.21 | 70 |
| 15 | 12 15 | 3-0 | 1-0 | 2-9 | 6-6 | 0-9 | 0.27 0.25 | 77 |
| 18 | 12 15 18 | 3-3 | 1-0 | 3-0 | 7-0 | 0-9 | 0.33 0.32 0.30 | 84 |
| 21 | 12 15 18 | 3-6 | 1-0 | 3-3 | 7-6 | 0-9 | 0.36 0.34 0.33 | 90 |
| 24 | 15 18 24 | 3-10 | 1-0 | 3-6 | 8-2 | 0-9 | 0.44 0.40 0.36 | 97 |
| 30 | 18 24 30 | 4-5 | 1-4 | 4-2 | 9-4 | 1-0 | 0.71 0.66 0.60 | 114 |
| 36 | 24 30 36 | 5-0 | 1-4 | 4-9 | 10-6 | 1-0 | 0.88 0.79 0.76 | 128 |
| 42 | 30 36 42 | 5-7 | 1-4 | 5-4 | 11-8 | 1-0 | 1.05 0.98 0.89 | 142 |
| 48 | 36 42 48 | 6-2 | 1-4 | 6-0 | 12-10 | 1-0 | 1.22 1.13 1.03 | 158 |
| 54 | 42 48 54 | 7-1 | 1-8 | 6-9 | 14-8 | 1-6 | 2.02 1.90 1.76 | 181 |
| 60 | 48 54 60 | 7-8 | 1-8 | 7-5 | 15-10 | 1-6 | 2.27 2.13 1.97 | 196 |
| 66 | 54 60 66 | 8-3 | 2-0 | 8-0 | 17-0 | 1-9 | 3.04 2.85 2.65 | 210 |
| 72 | 60 66 72 | 8-10 | 2-0 | 7-7 | 18-2 | 1-9 | 3.36 3.16 2.93 | 225 |

| TABLE OF DIMENSIONS | | | | | | | | | | |
|---------------------|-----------------|-------------|-------------|-------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|-------------------|--------------|
| BOX SIZE (FT.) | PIPE SIZE (IN.) | DIMENSIONS | | | LENGTH OF BARS | | | | QUANTITIES | |
| | | A (FT.-IN.) | B (FT.-IN.) | C (FT.-IN.) | A (#5) 6 REQUIRED (FT.-IN.) | B (#6) 4 REQUIRED (FT.-IN.) | C (#4) 8 REQUIRED (FT.-IN.) | D (#5) 6 REQUIRED (FT.-IN.) | CONCRETE (CU.YD.) | STEEL (LBS.) |
| 2 x 1 1/2 | 24 | 5-1 | 4-9 | 1-0 | 4-10 | 10-4 | 0-9 | 4-6 | 0.65 | 124 |
| 2 x 2 | 30 | 5-3 | 5-3 | 1-4 | 5-0 | 11-0 | 1-0 | 5-0 | 0.93 | 134 |
| 3 x 2 | 36 | 6-1 | 5-10 | 1-4 | 5-10 | 12-5 | 1-0 | 5-7 | 1.16 | 151 |
| 3 x 3 | 42 | 6-5 | 6-5 | 1-4 | 6-0 | 13-4 | 1-0 | 6-0 | 1.29 | 162 |



TYPE B COLLAR
(FOR CONCRETE PIPE TO
CORRUGATED METAL PIPE)



PIPE PLACEMENT

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

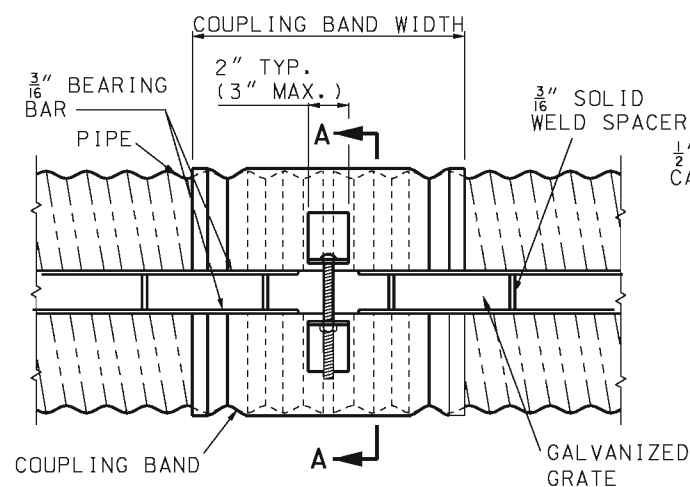
PIPE COLLARS

DATE EFFECTIVE: 10/01/2000
DATE PREPARED: 8/21/2009

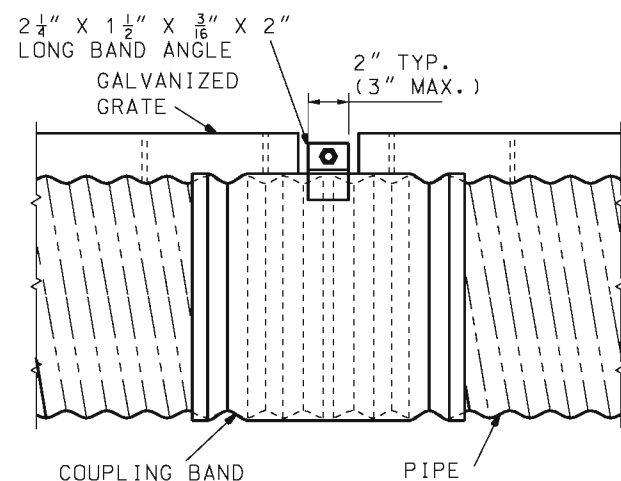
604.40F

SHEET NO.
2 OF 2

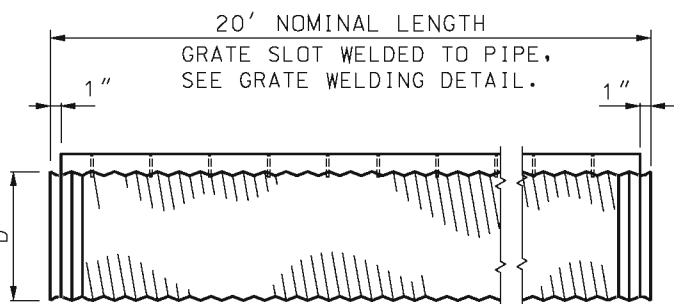
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TOP VIEW



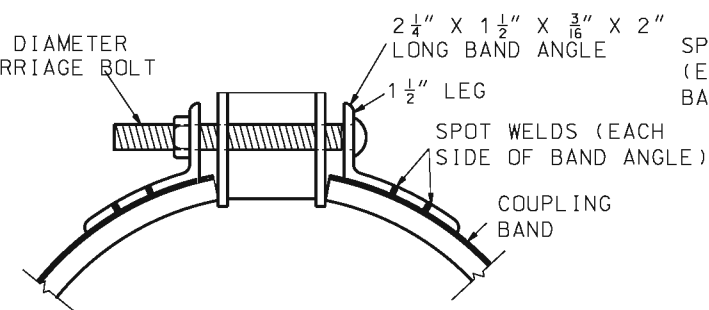
SIDE VIEW
TYPICAL COUPLING BAND



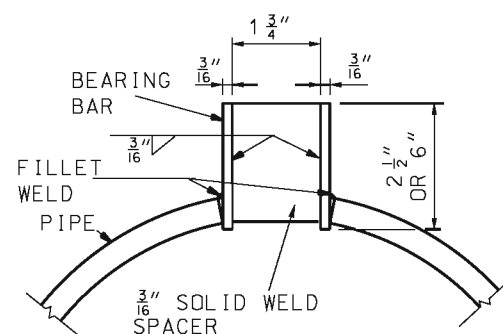
TYPICAL PIPE SECTION

D = { 1 1/2", 1 3/4", 2", 2 1/4", 2 3/4", 3", 3 1/2", 4", 4 1/2", 5", 5 1/2", 6" }

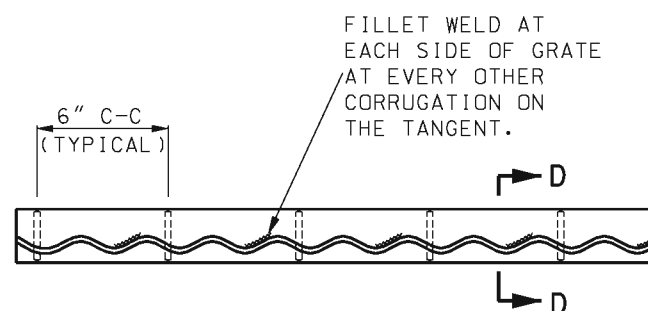
STRUCTURAL STEEL SLOTTED DRAIN
(TYPE B)



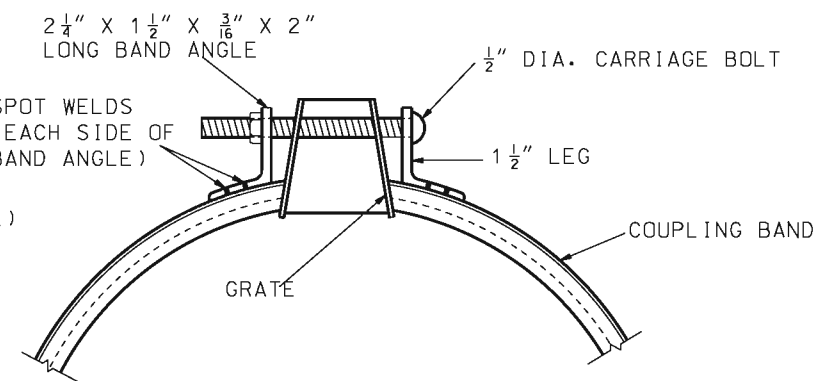
SECTION A-A



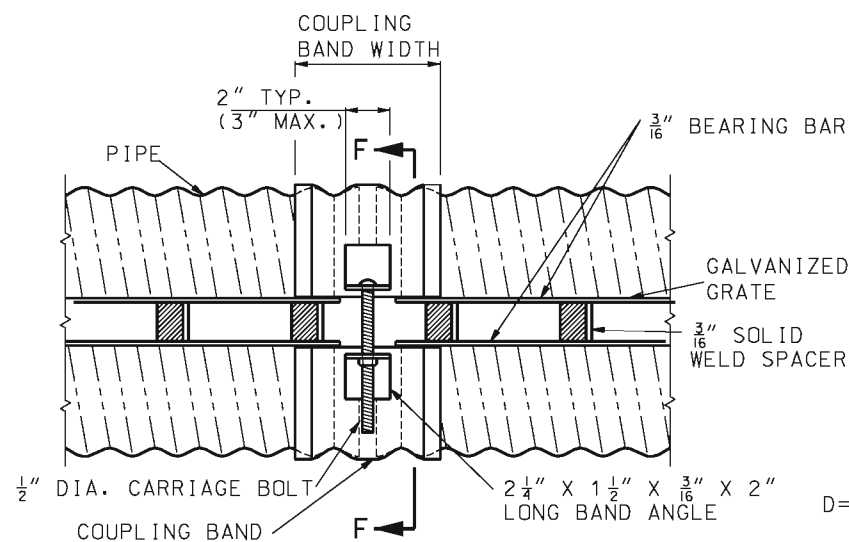
SECTION D-D



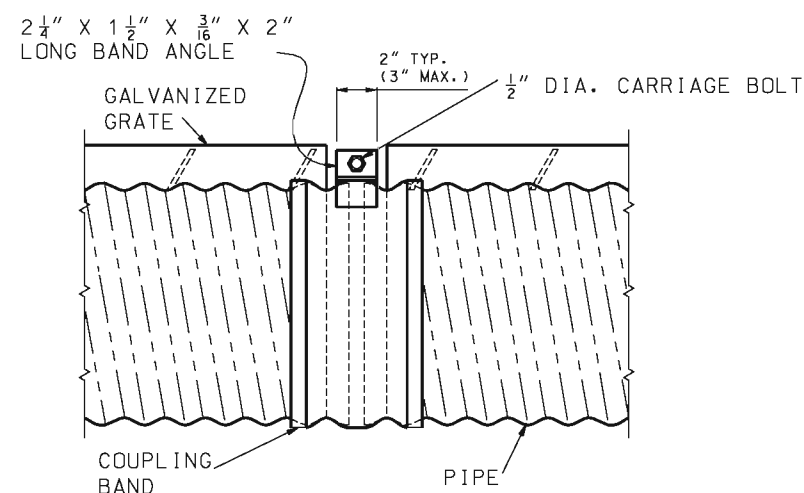
GRATE WELDING DETAIL



SECTION F-F



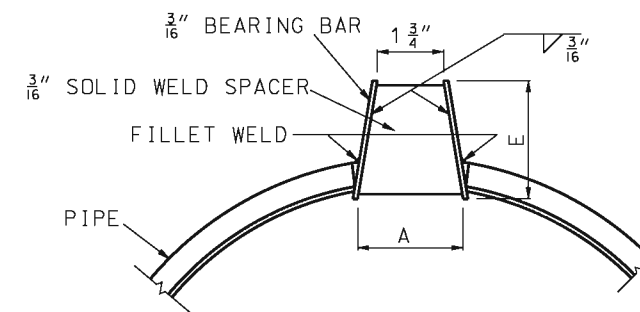
TOP VIEW



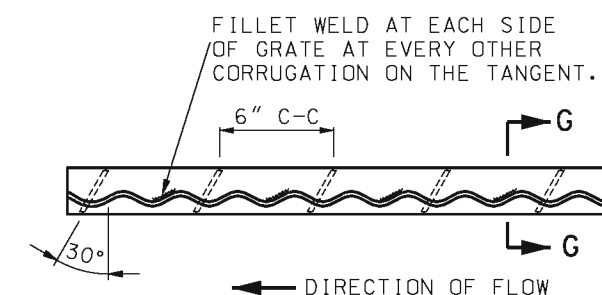
SIDE VIEW
TYPICAL COUPLING BAND

STRUCTURAL STEEL SLOTTED DRAIN
(TYPE C)

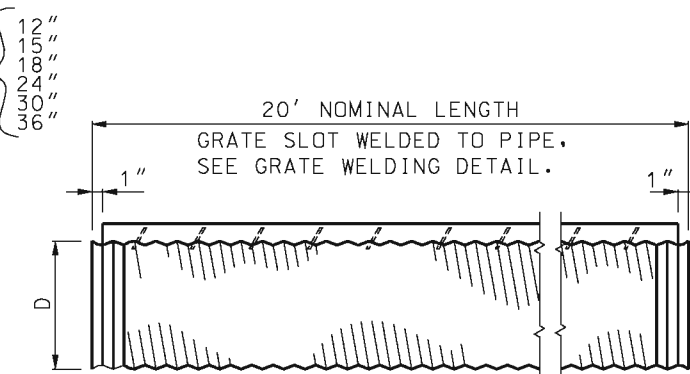
| GRATE TYPE | "E" | "A" |
|------------|--------|--------|
| C | 2 1/2" | 2 1/4" |
| C | 6" | 3" |



SECTION G-G



GRATE WELDING DETAIL



TYPICAL PIPE SECTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

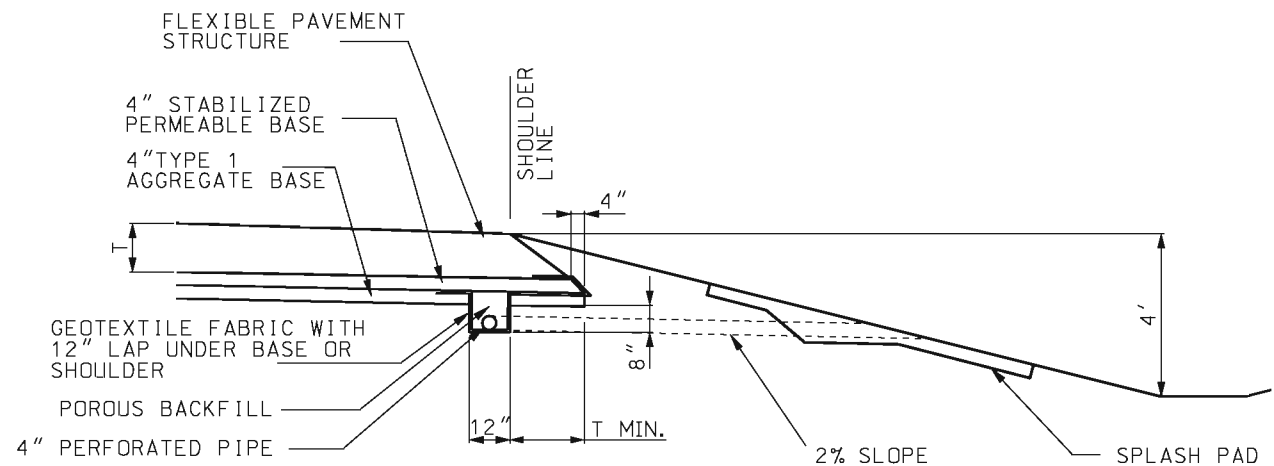
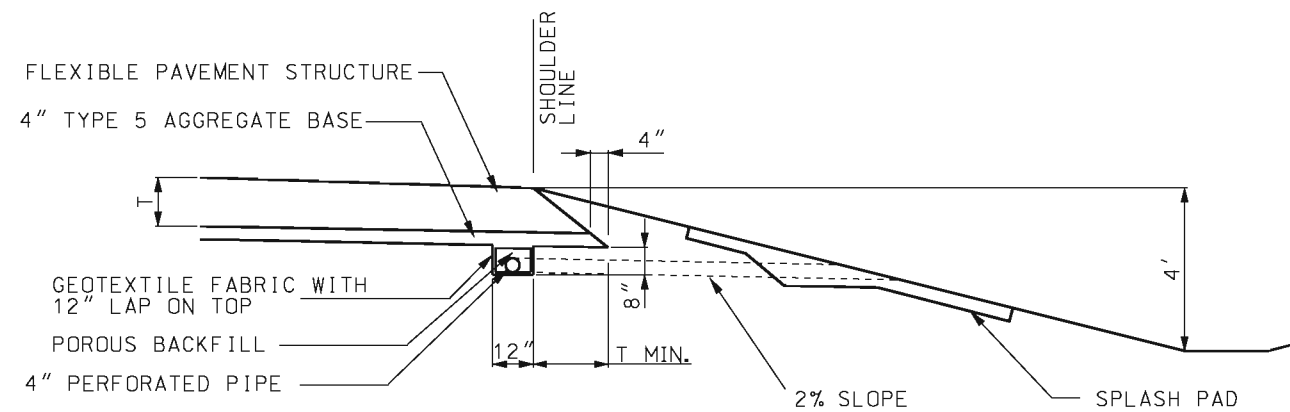
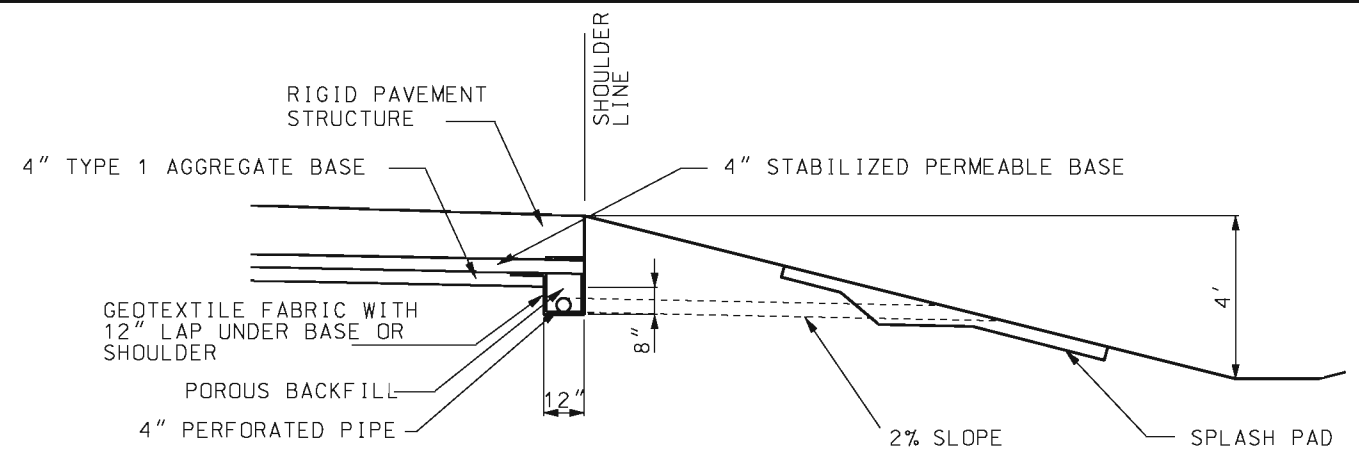
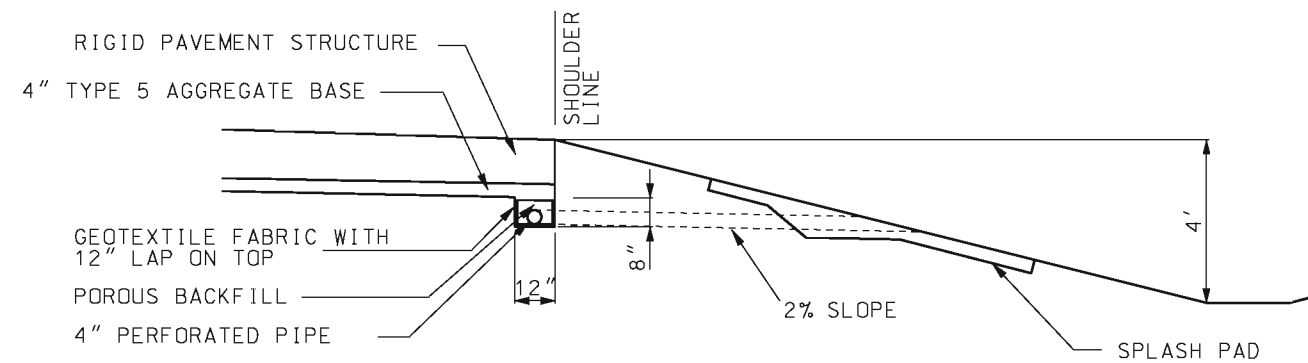
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

SLOTTED DRAIN
TYPE B AND TYPE C

DATE EFFECTIVE: 03/01/1994
DATE PREPARED: 8/21/2009

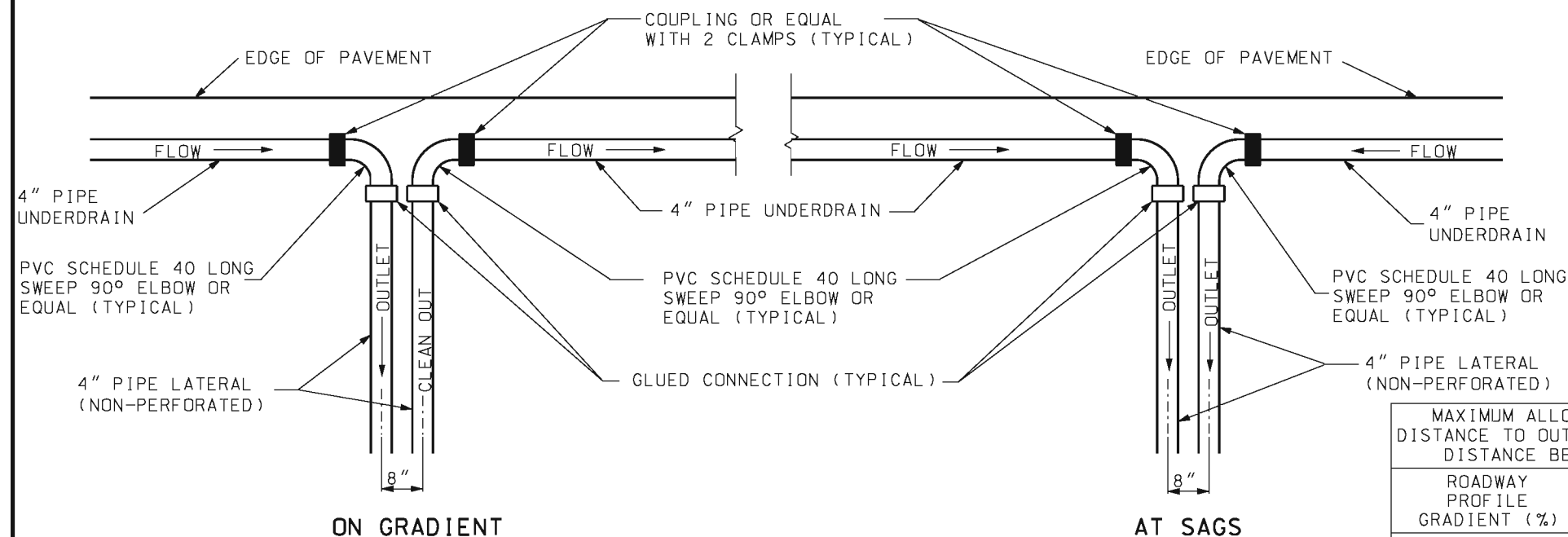
604.70

SHEET NO.
2 OF 2



MEDIUM DUTY

HEAVY DUTY




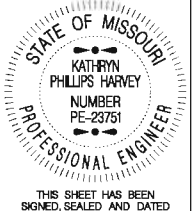
DETAIL OF PIPE AGGREGATE DRAIN OUTLETS

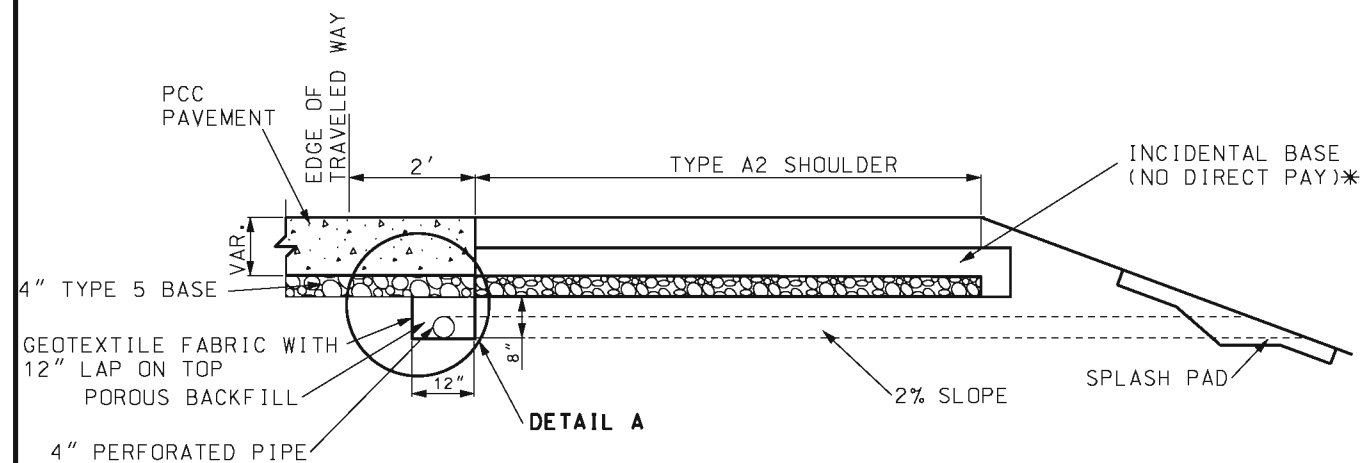
| MAXIMUM ALLOWABLE DRAINAGE DISTANCE TO OUTLET OR SEPARATION DISTANCE BETWEEN OUTLETS | |
|--|----------|
| ROADWAY PROFILE GRADIENT (%) | DISTANCE |
| ≤ 1 | 250 FT. |
| > 1 AND ≤ 2 | 375 FT. |
| > 2 | 500 FT. |

GENERAL NOTES:

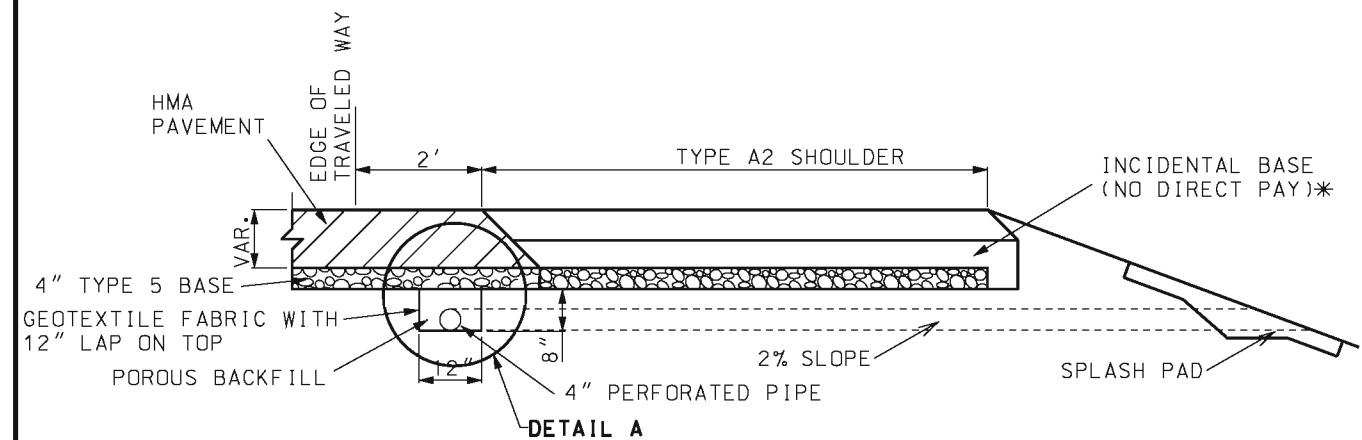
ON SUPERELEVATED CURVES PLACE LONGITUDINAL UNDERDRAIN ON LOW SIDE ONLY.

CONSTRUCT OUTLETS AT LOW POINT OF SAG CURVE.

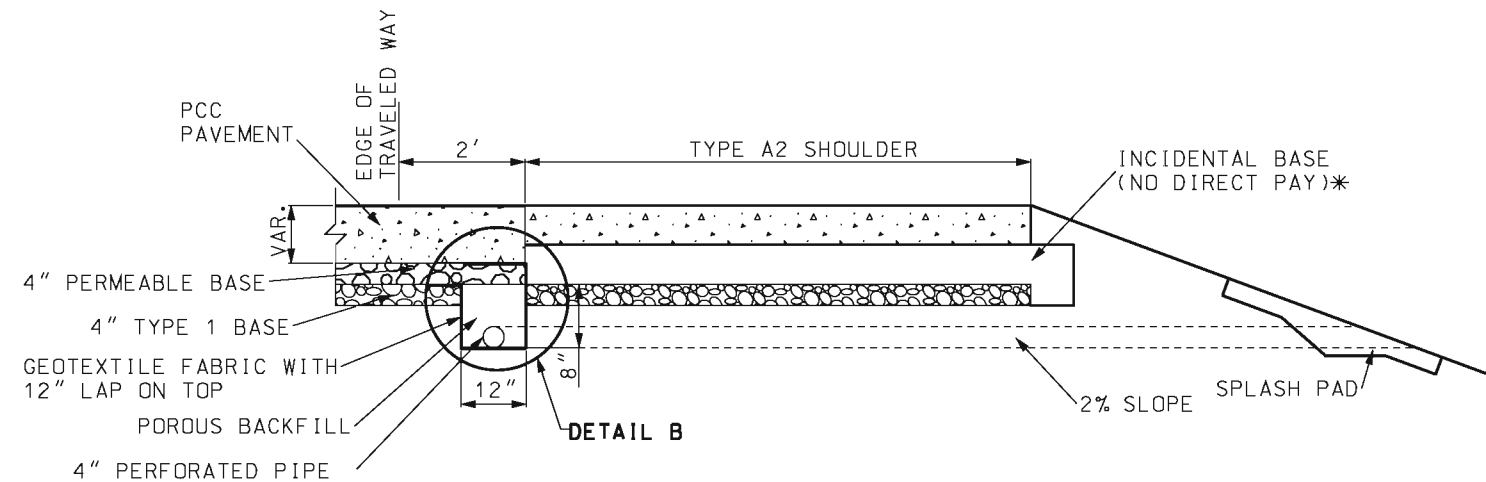
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PAVEMENT UNDERDRAINAGE PIPE AGGREGATE PAVEMENT EDGE DRAINS FOR FULL DEPTH SHOULDERS |
| DATE EFFECTIVE: 06/01/2013 DATE PREPARED: 4/1/2013 | 605.101 SHEET NO. 1 OF 4 |



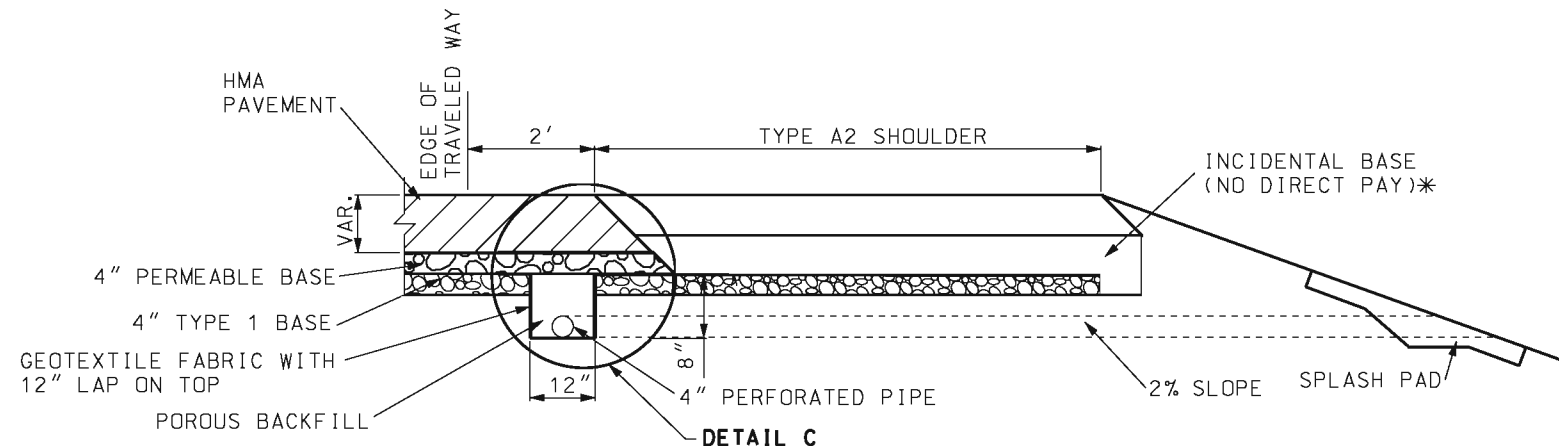
RIGID PAVEMENT WITH TYPE 5 BASE






FLEXIBLE PAVEMENT WITH TYPE 5 BASE



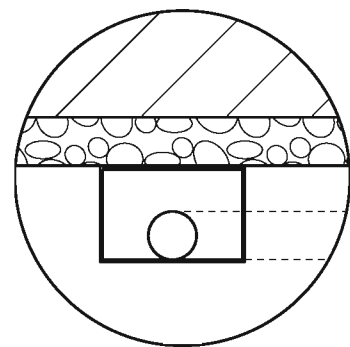
RIGID PAVEMENT WITH PERMEABLE BASE



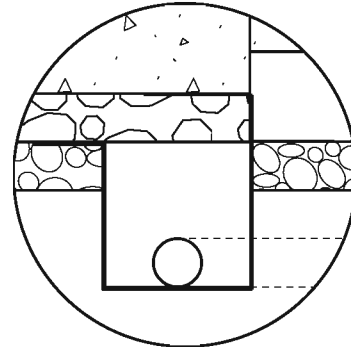
FLEXIBLE PAVEMENT WITH PERMEABLE BASE

-  PCC (PORTLAND CEMENT CONCRETE)
-  HMA (HOT MIX ASPHALT)
-  BASE

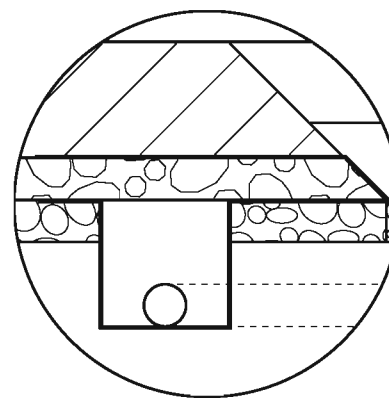
* BASE MATERIAL (ASPHALT MILLINGS, RECYCLED CONCRETE, TYPE 1 BASE, ETC.) APPROVED BY THE ENGINEER.



DETAIL A




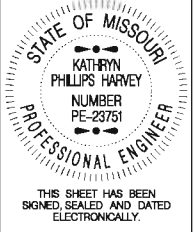
DETAIL B

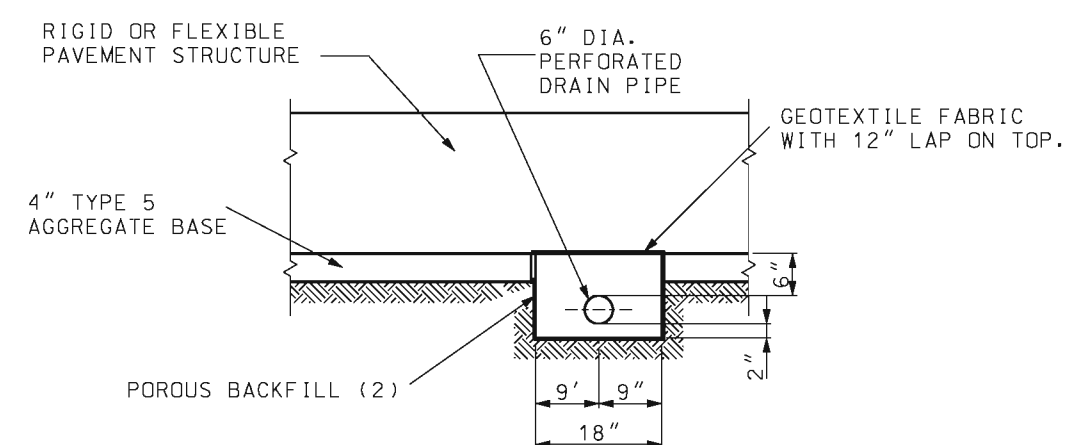


DETAIL C

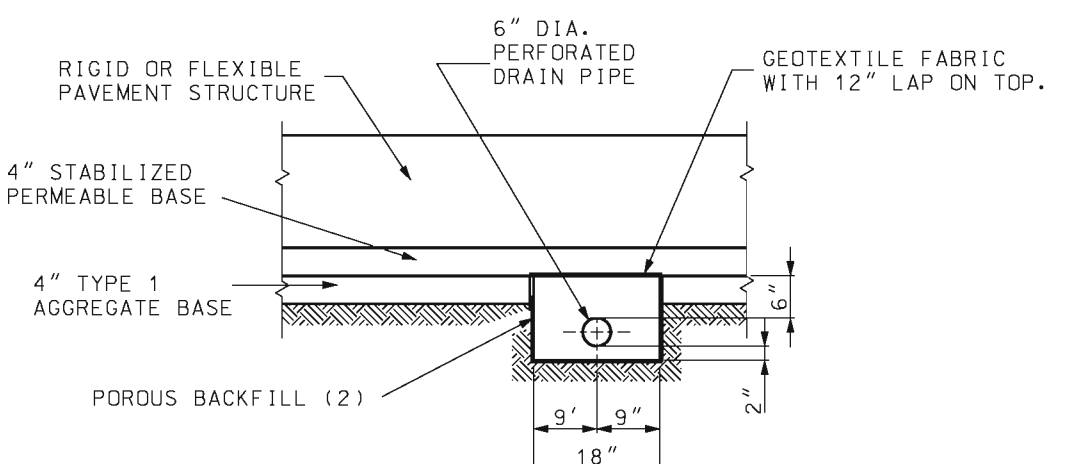
GENERAL NOTES:

SEE DETAIL OF PIPE AGGREGATE DRAIN OUTLETS ON SHEET 1.

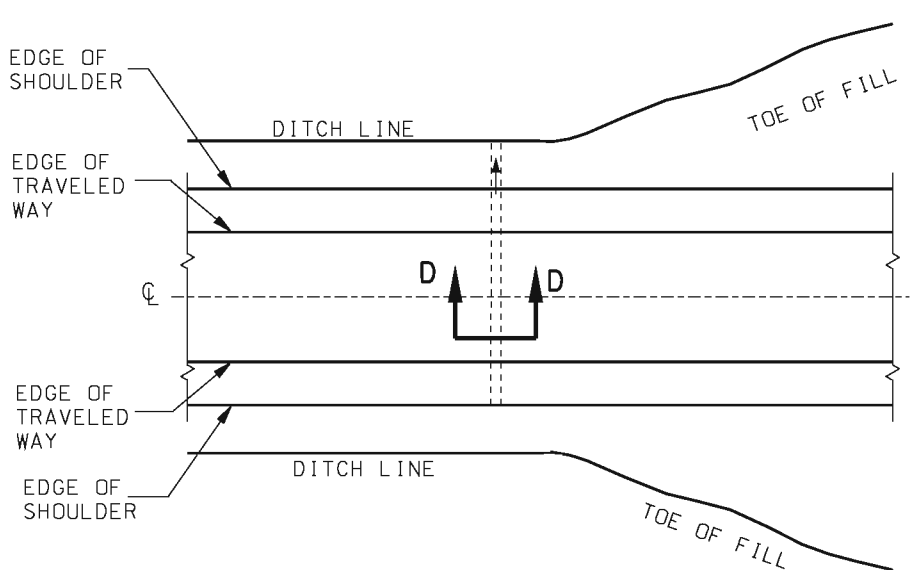
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PAVEMENT UNDERDRAINAGE PIPE AGGREGATE PAVEMENT EDGE DRAINS FOR TYPE A2 SHOULDERS |
| DATE EFFECTIVE: 06/01/2013 DATE PREPARED: 4/1/2013 | 605.101 |
| SHEET NO. 2 OF 4 | |



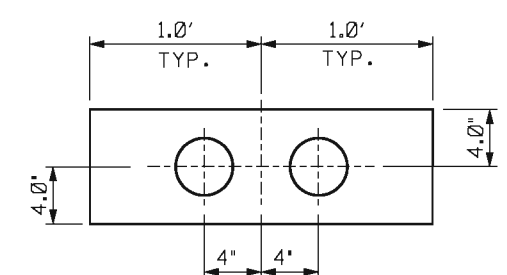
SECTION D-D
WITHOUT PERMEABLE BASE



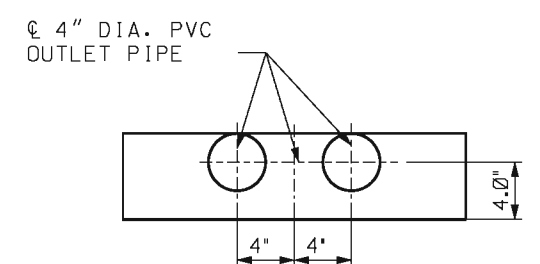
SECTION D-D
WITH PERMEABLE BASE



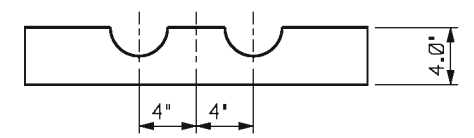
CROSS DRAIN



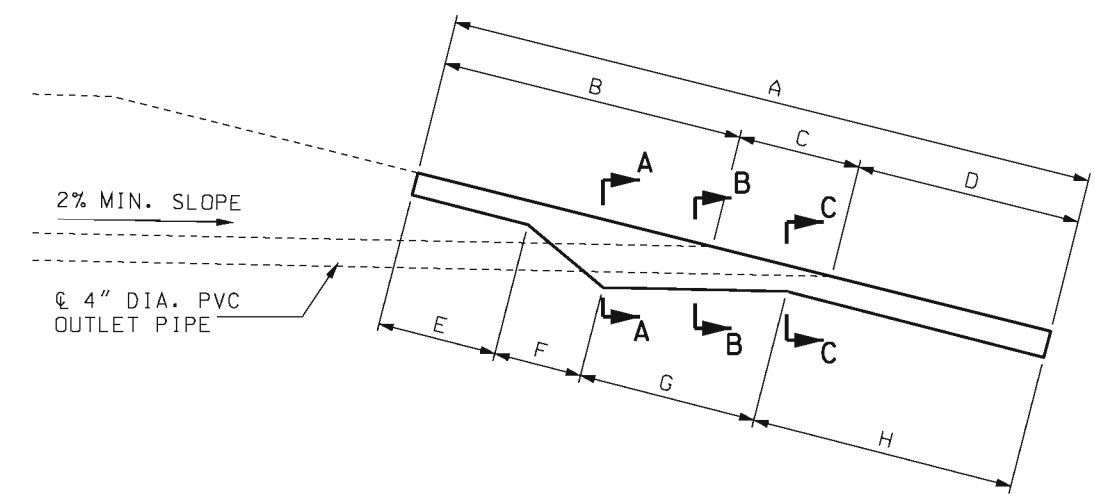
SECTION A-A



SECTION B-B



SECTION C-C



CONCRETE SPLASH PADS


| ITEM | 2:1 | 3:1 | 4:1 | 6:1 |
|-------|-----------|-----------|-----------|-----------|
| A | 5.48' | 6.19' | 6.95' | 8.58' |
| B | 2.70' | 3.07' | 3.46' | 4.28' |
| C | 0.78' | 1.12' | 1.49' | 2.30' |
| D | 2.00' | 2.00' | 2.00' | 2.00' |
| E | 2.00' | 2.00' | 2.00' | 2.00' |
| F | 0.46' | 0.61' | 0.78' | 1.18' |
| G | 0.71' | 1.07' | 1.46' | 2.27' |
| H | 2.31' | 2.51' | 2.71' | 3.13' |
| CONC. | 0.15 C.Y. | 0.17 C.Y. | 0.20 C.Y. | 0.25 C.Y. |

GENERAL NOTES:

PRECAST CONCRETE SPLASH PADS MAY BE INSTALLED AS APPROVED BY THE ENGINEER.

TOP OF SPLASH PAD SHALL MATCH EXISTING CROSS SLOPE. CONSTRUCT BEND IN SPLASH PAD WHERE CROSS SLOPE CHANGES.


DIMENSIONS ARE APPROXIMATE AND CAN BE ADJUSTED AS DIRECTED BY THE ENGINEER.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

**PAVEMENT UNDERDRAINAGE
CROSS DRAINS**

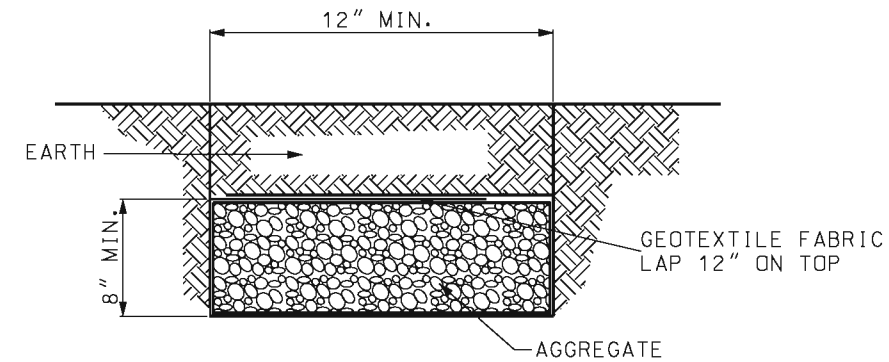


THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

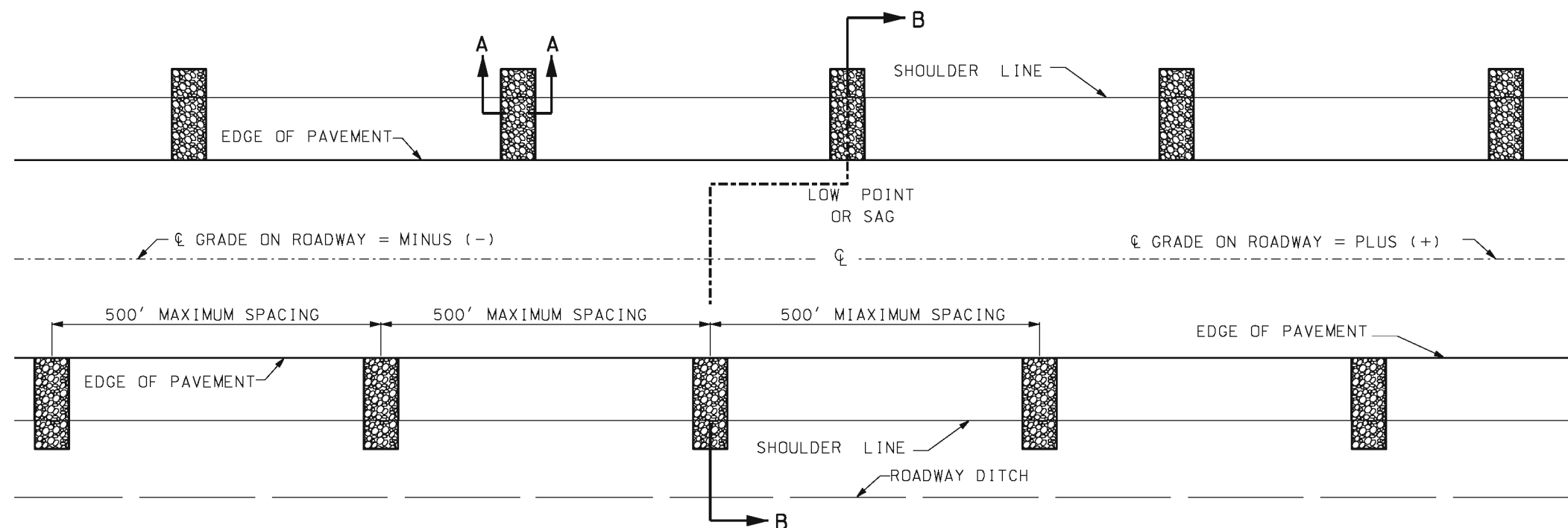
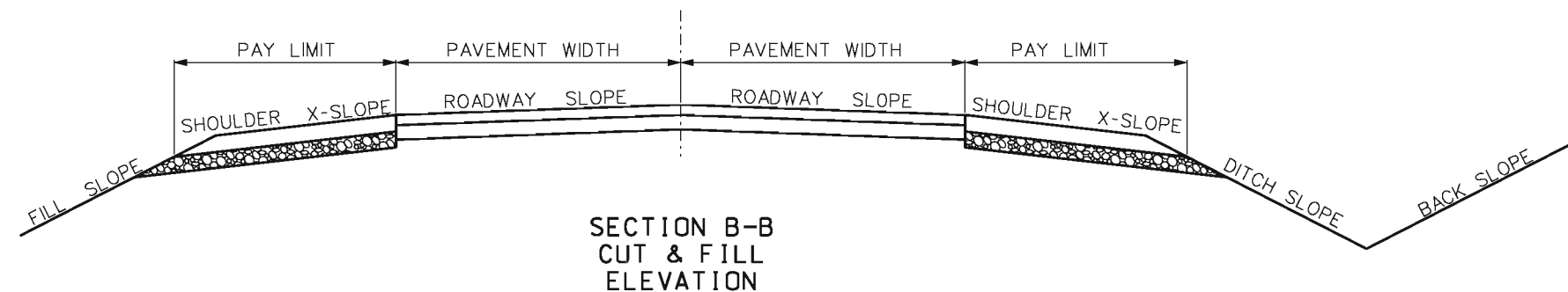
DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

605.101

SHEET NO.
3 OF 4



SECTION A-A




PLAN

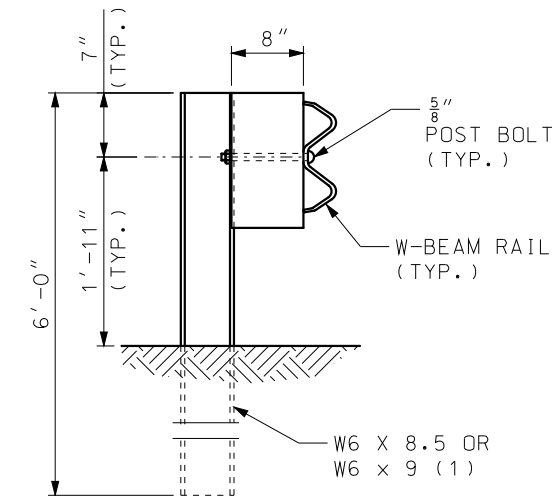
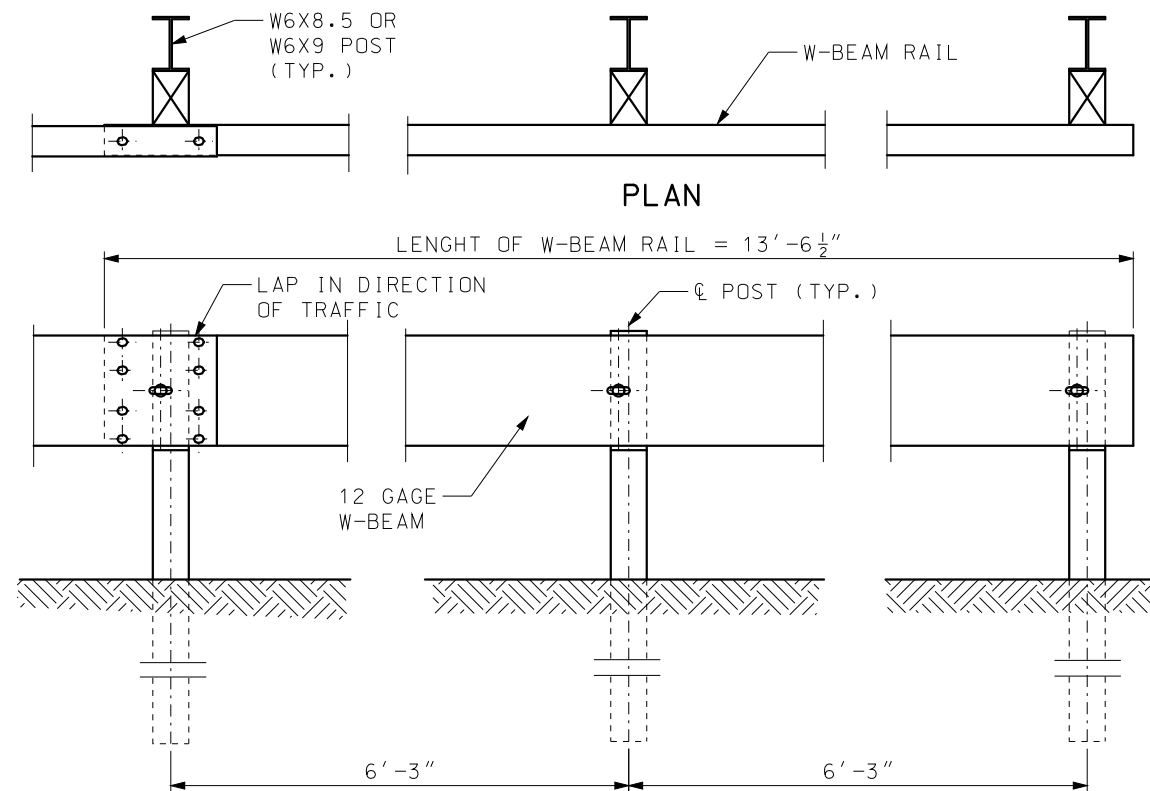
GENERAL NOTES:

AGGREGATE UNDERDRAIN TO BE USED ONLY WHERE DESIGNATED ON PLANS.

AGGREGATE UNDERDRAIN SHALL BE PLACED AT THE LOW POINT OF THE SAG AND THE SPACING OF AGGREGATE UNDERDRAIN SHALL BE APPROX. 500'. AGGREGATE UNDERDRAINS WILL BE OMITTED ON THE CREST VERTICAL CURVES AND ON THE HIGH SIDE OF SUPERELEVATION. THE LOW SIDE OF SUPERELEVATION SPACING MAY BE DECREASED AS DIRECTED BY ENGINEER.

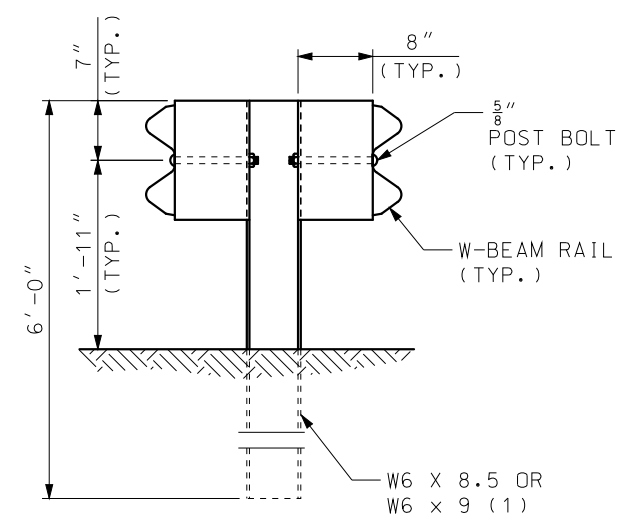
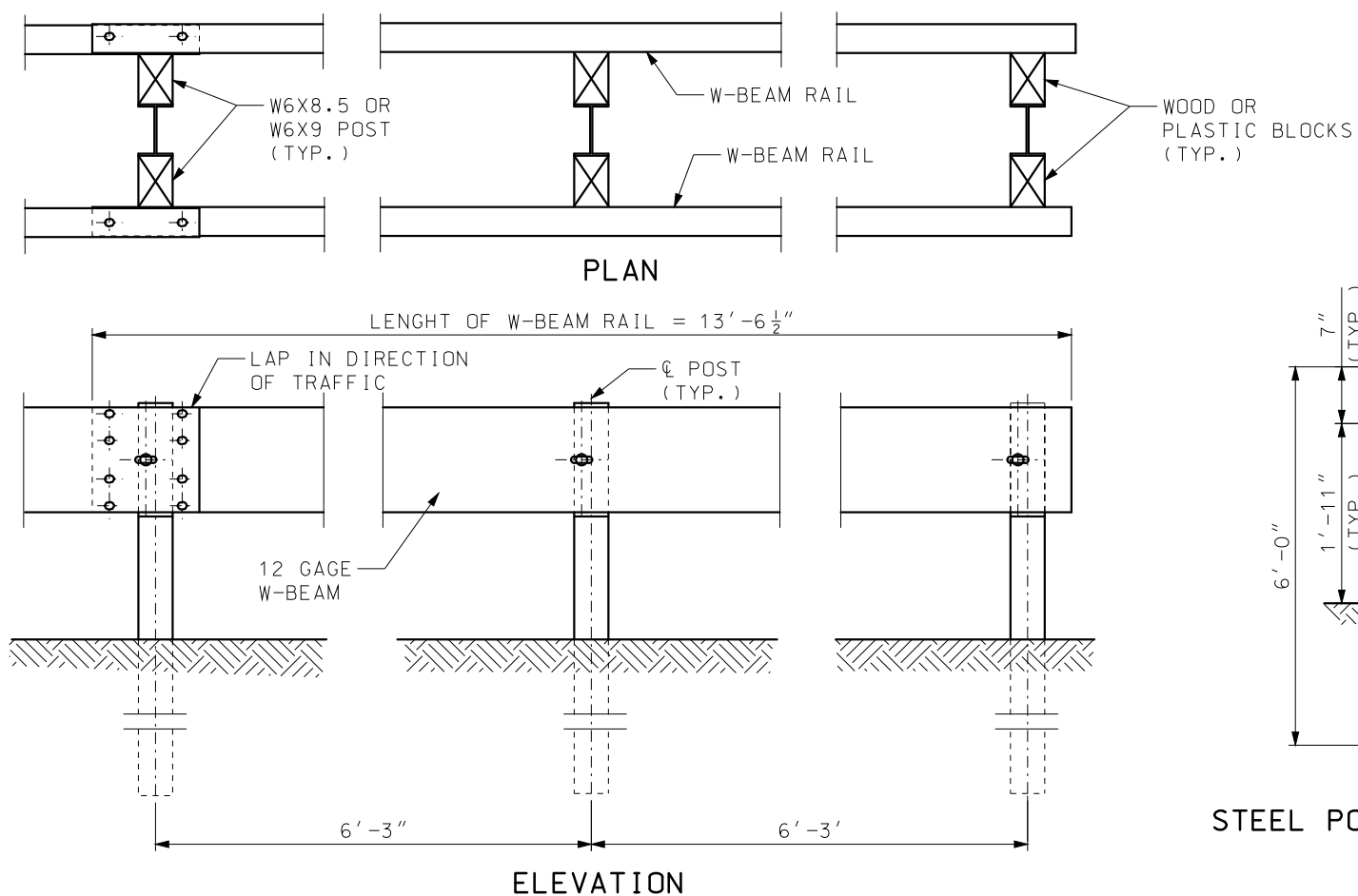
THE BOTTOM OF THE AGGREGATE DRAINS SHALL BE AT OR BELOW THE BOTTOM OF THE PAVEMENT'S AGGREGATE SUBBASE AT THE POINT OF CONTACT. THE TOP OF THE AGGREGATE DRAINS SHALL BE NO HIGHER THAN THE BOTTOM OF THE SHOULDER'S AGGREGATE BASE.

| | |
|---|--|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI</p> <p>KATHRYN PHILLIPS HARVEY</p> <p>NUMBER PE-23751</p> <p>PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PAVEMENT UNDERDRAINAGE</p> <p>AGGREGATE UNDERDRAINS</p> |
| <p>DATE EFFECTIVE: 06/01/2013</p> <p>DATE PREPARED: 4/1/2013</p> | <p>605.101</p> |
| <p>SHEET NO. 4 OF 4</p> | |



STEEL POST & WOOD OR PLASTIC BLOCK

TYPE A GUARDRAIL


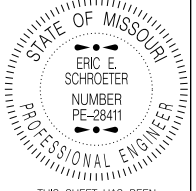


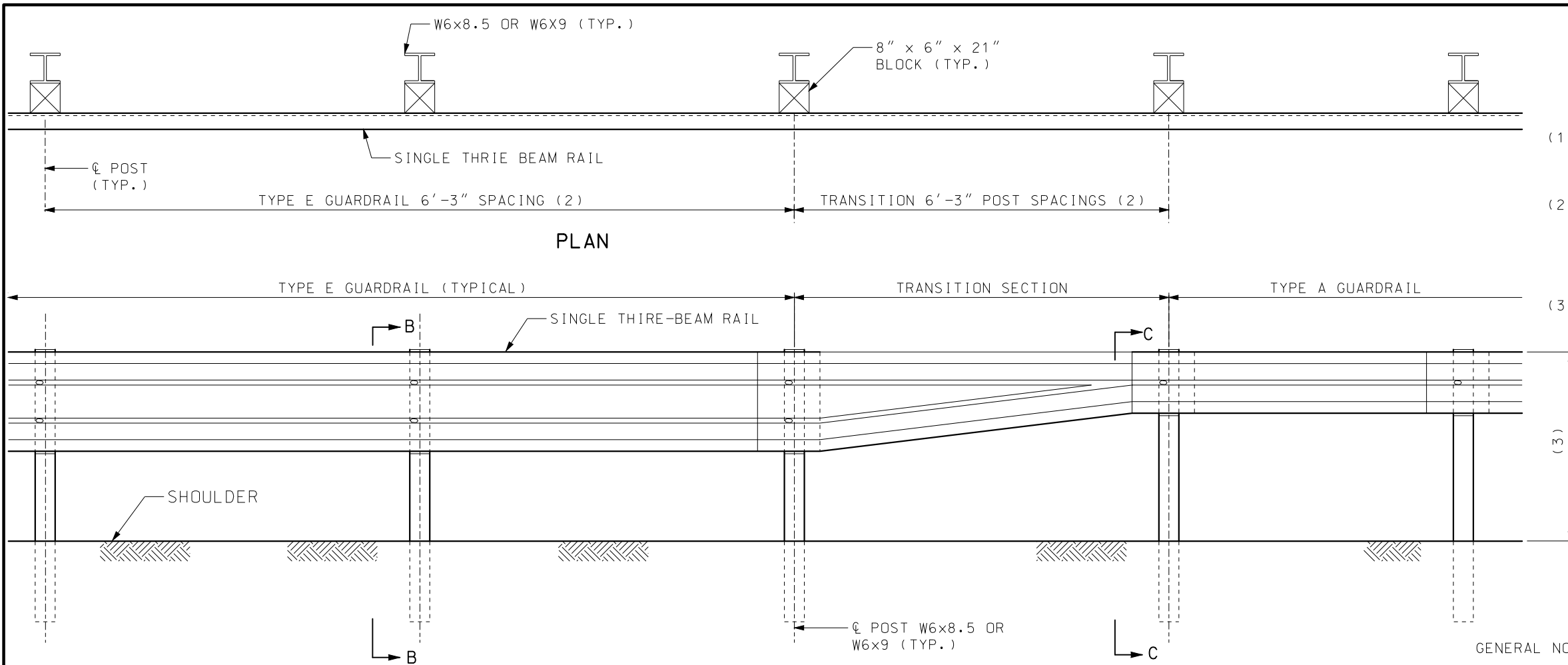
STEEL POST & WOOD OR PLASTIC BLOCKS

TYPE B GUARDRIAL

(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SECTION 1040.

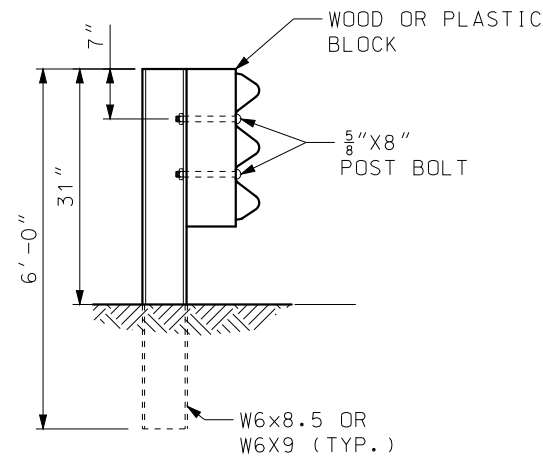
GENERAL NOTES:
SEE SHEET NO. 5 OF 7 FOR POST AND BLOCK DETAILS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | GUARDRAIL TYPE A AND TYPE B |
| DATE EFFECTIVE: 01/01/2017 DATE PREPARED: 10/28/2016 | 606.00AY |
| SHEET NO. 1 OF 7 | |

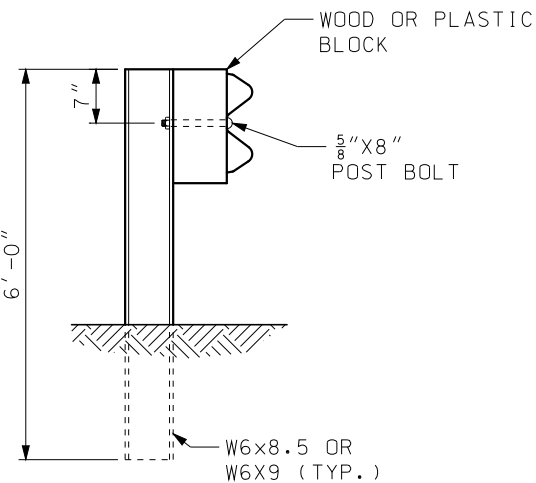


PART SECTION SHOWING TYPE E TO TYPE A GUARDRAIL TRANSITION

THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE $\frac{7}{8}$ " \pm $\frac{1}{4}$ " FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.



SECTION B-B



SECTION C-C

- (1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.
- (2) IF THE TRANSITION IS CONNECTED TO A BRIDGE ANCHOR SECTION, POST SPACING FOR TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE 3'-1 1/2". FOR ALL OTHER CASES, POST SPACING SHALL BE 6'-3".
- (3) TRANSITION FROM 31" TO 29" HEIGHT OVER 2-12.5' W-BEAMS OR 25'.

GENERAL NOTES:

TYPE E GUARDRAIL SHALL USE 6'-3" POST SPACING UNLESS 3'-1 1/2" POST IS SPECIFIED.


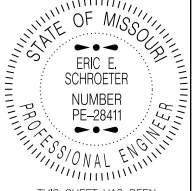
THE THRIE BEAM RAIL FOR THE TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAGE.

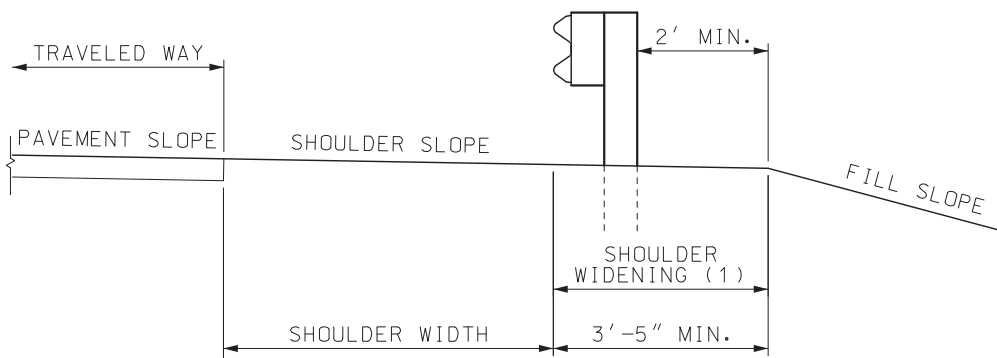
FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 7 OF 7 FOR REQUIREMENTS FOR SPECIAL INSTALLATIONS.

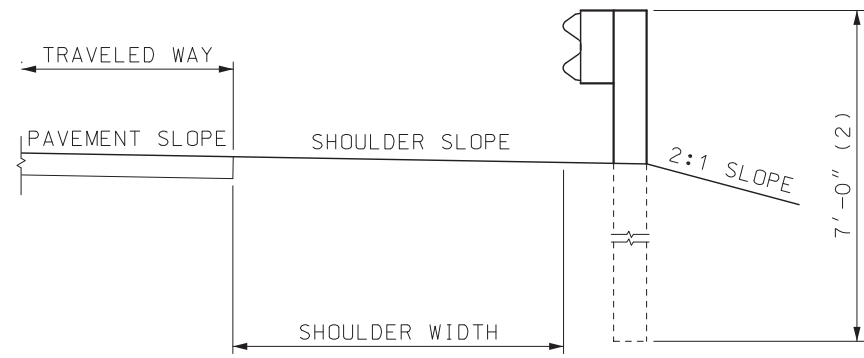
ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

FOR DETAILS NOT SHOWN, SEE OTHER SHEETS OF THIS DRAWING.

| | |
|--|--------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>GUARDRAIL TYPE E</p> |
| DATE EFFECTIVE: 01/01/2017 DATE PREPARED: 10/28/2016 | 606.00AY |
| SHEET NO. 2 OF 7 | |

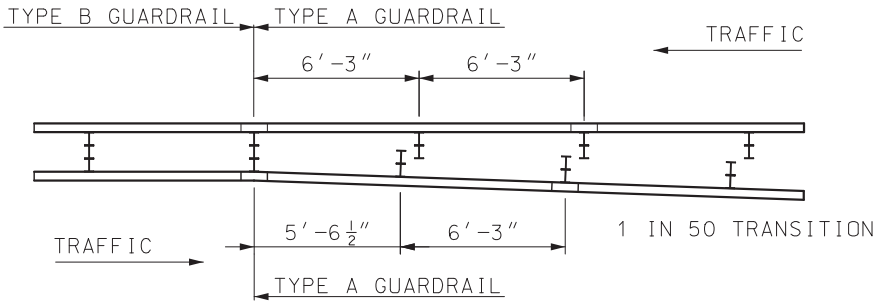


TYPICAL SECTION

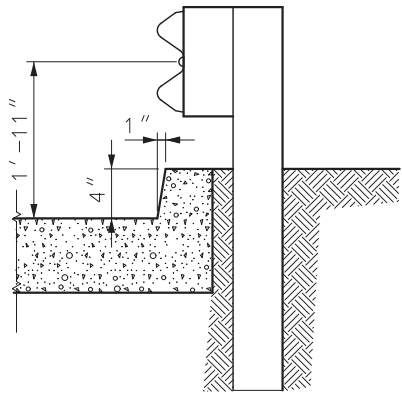
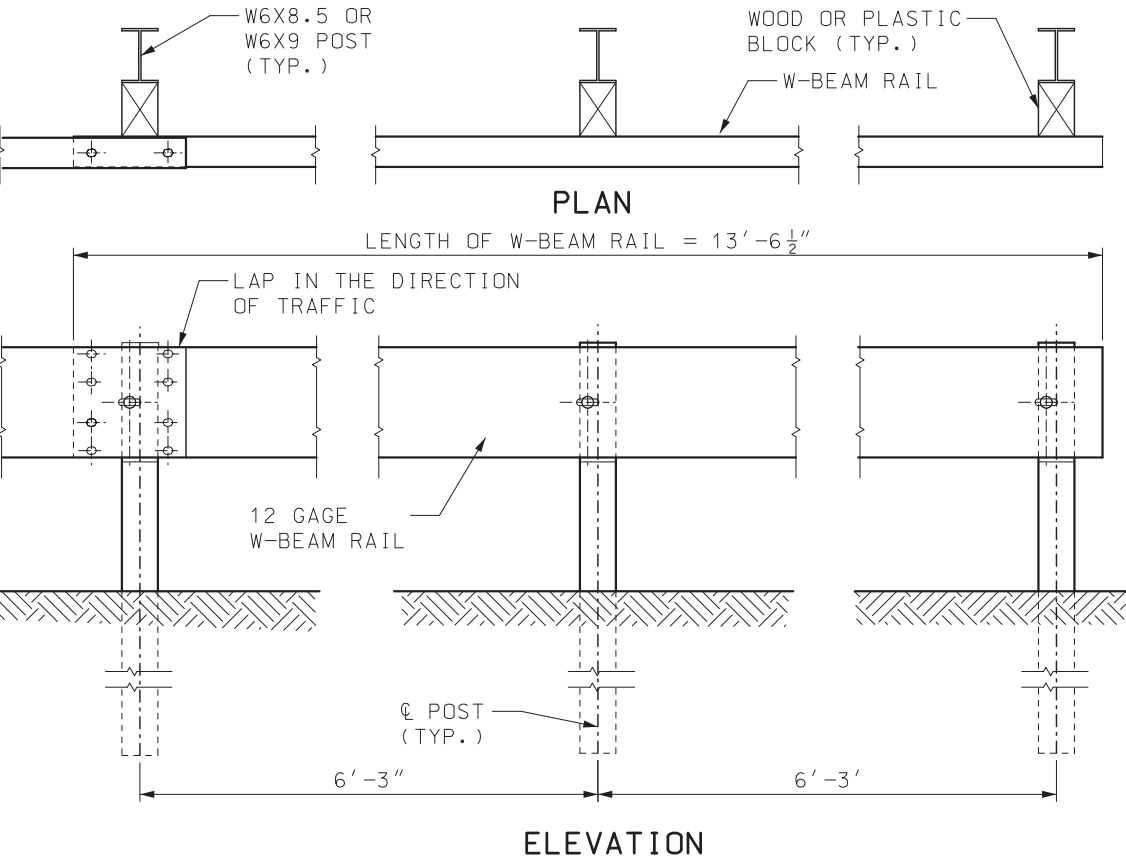


ALTERNATE TYPICAL SECTION AT SLOPE BREAKPOINT

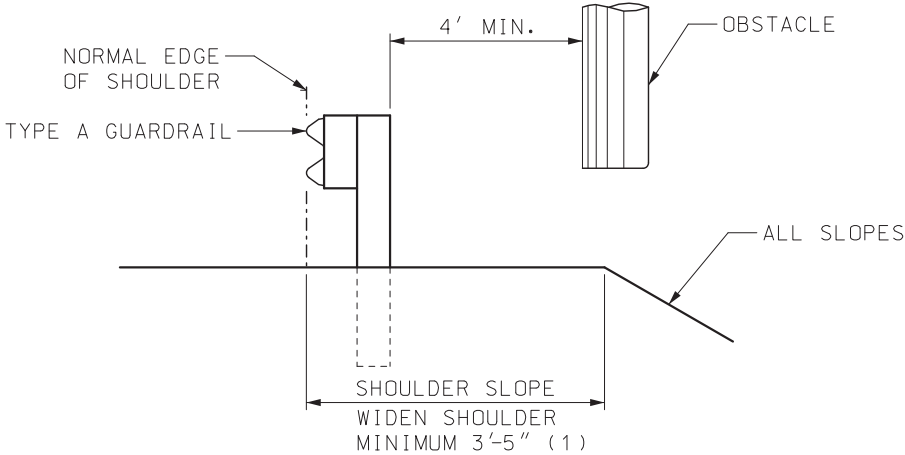
- (1) SHOULDER WIDENING SHALL CONSIST OF EMBANKMENT MATERIAL COMPACTED IN ACCORDANCE WITH SEC 203.4 OF THE STANDARD SPECIFICATIONS.
- (2) POST SHALL BE SPACED AT 3'-1 1/2" ON CENTER.
- (3) WHEN GUARDRAIL IS CONSTRUCTED OVER CURBS, THE CURBS SHALL BE CONSTRUCTED AS SHOWN.





DETAIL FOR TRANSITIONING
BETWEEN TYPE A AND TYPE B GUARDRAIL



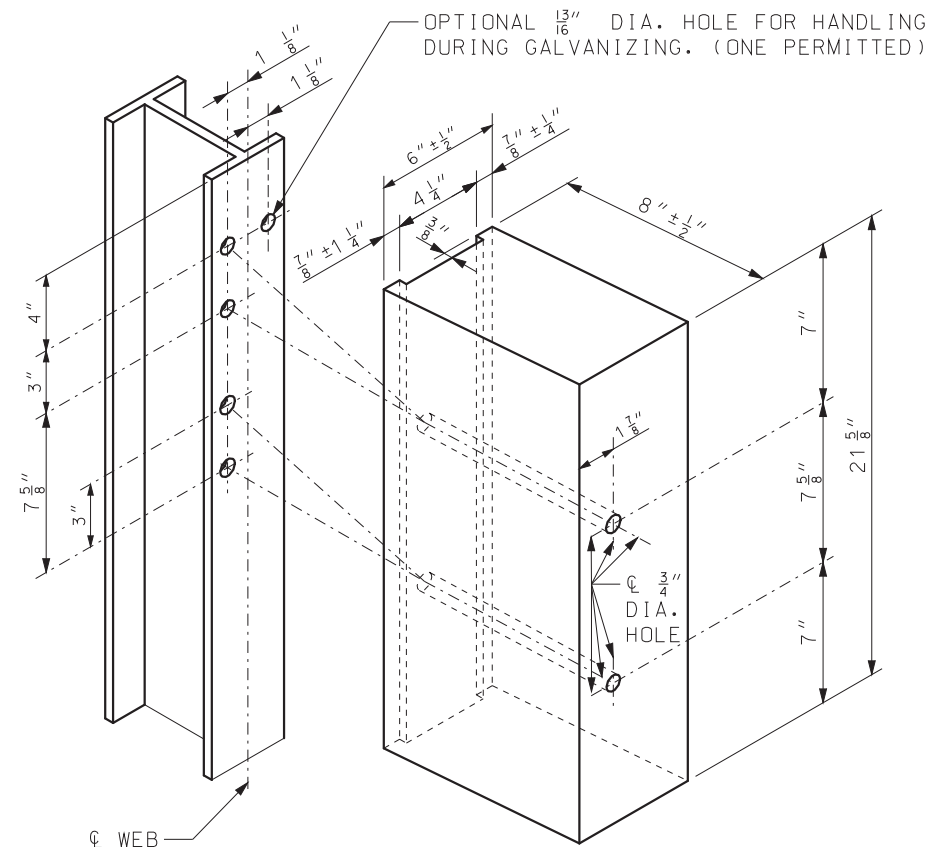
GUARDRAIL AT CURBS (3)



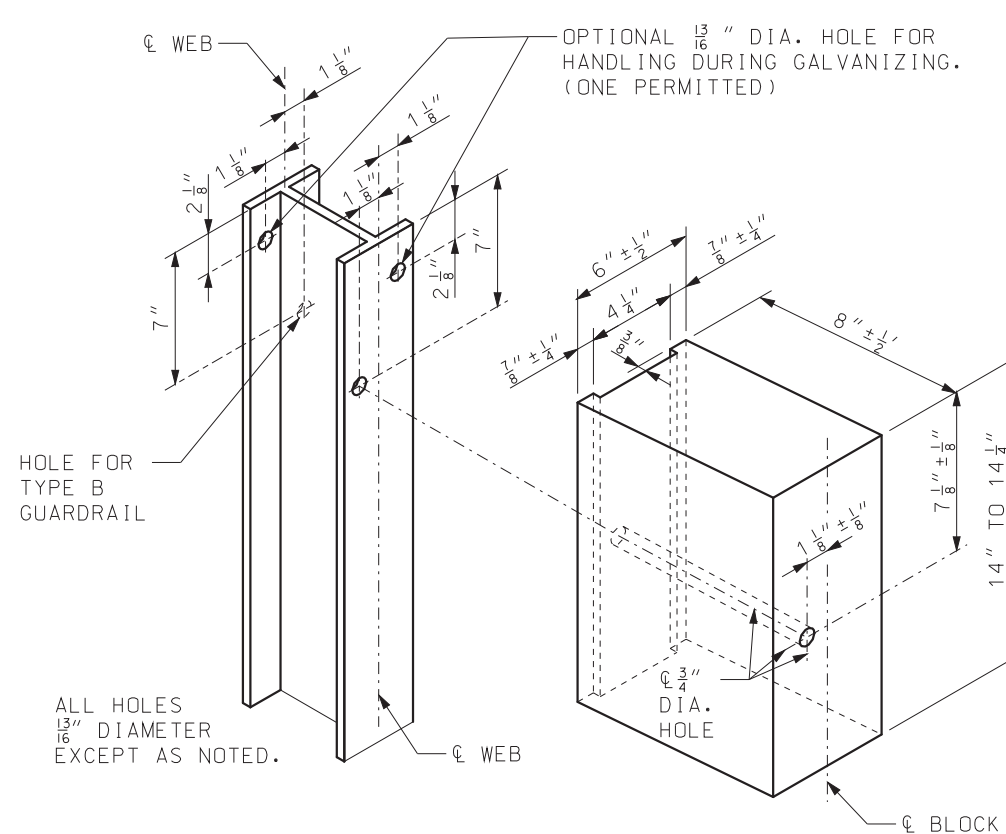
LOCATION OTHER THAN CL MEDIAN
LATERAL PLACEMENT OF GUARDRAIL
FOR SHOULDER INSTALLATION

| | |
|--|-------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | GUARDRAIL LAYOUT |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/21/2019 | 606.00AY |
| SHEET NO. 3 OF 7 | |

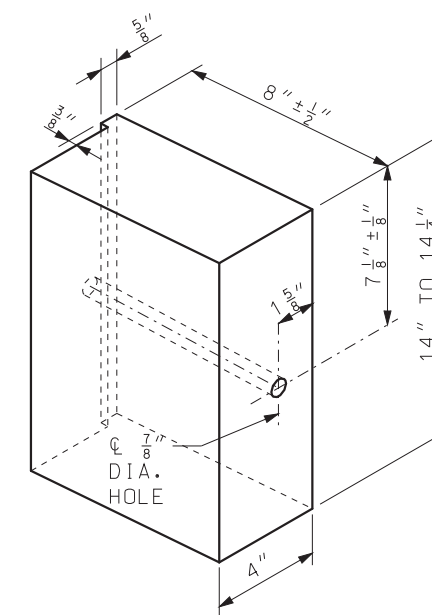
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TYPE E
FOR STEEL POST & WOOD OR PLASTIC BLOCKS (1)

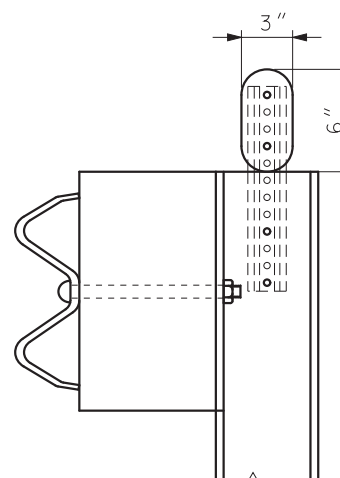
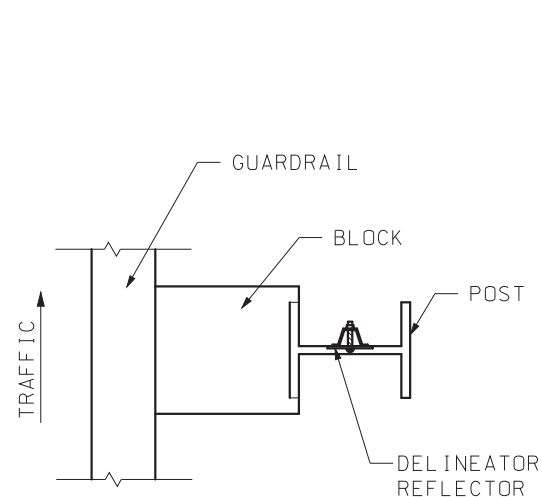


TYPE A AND TYPE B
FOR STEEL POST AND WOOD OR PLASTIC BLOCKS (1)

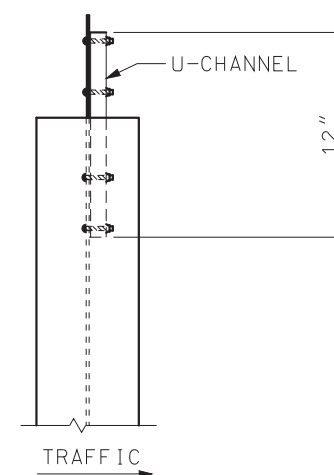


ALTERNATE DESIGN
FOR WOOD BLOCK

(1) THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE $\frac{1}{8}$ " \pm $\frac{1}{4}$ " FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.


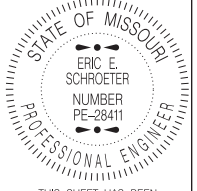


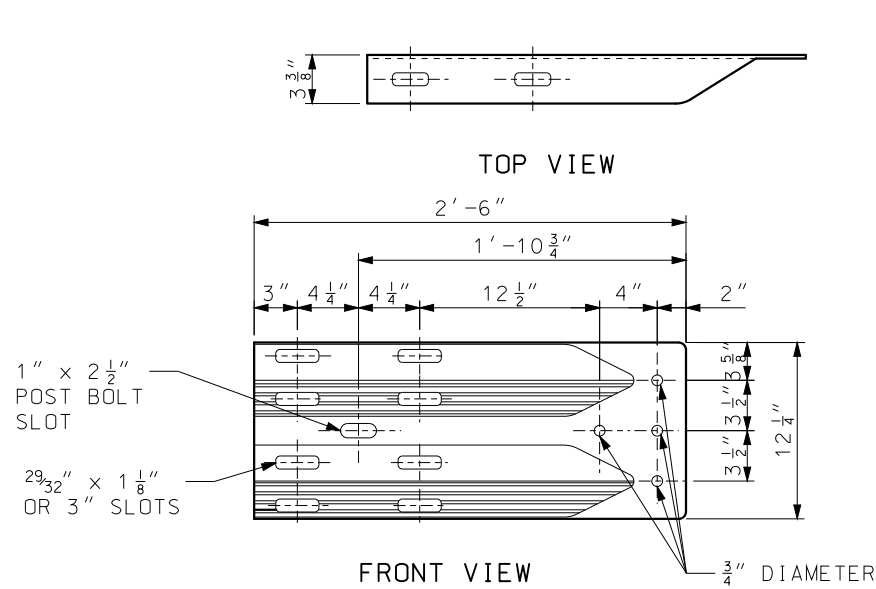
DELINEATORS ON NEW GUARDRAIL



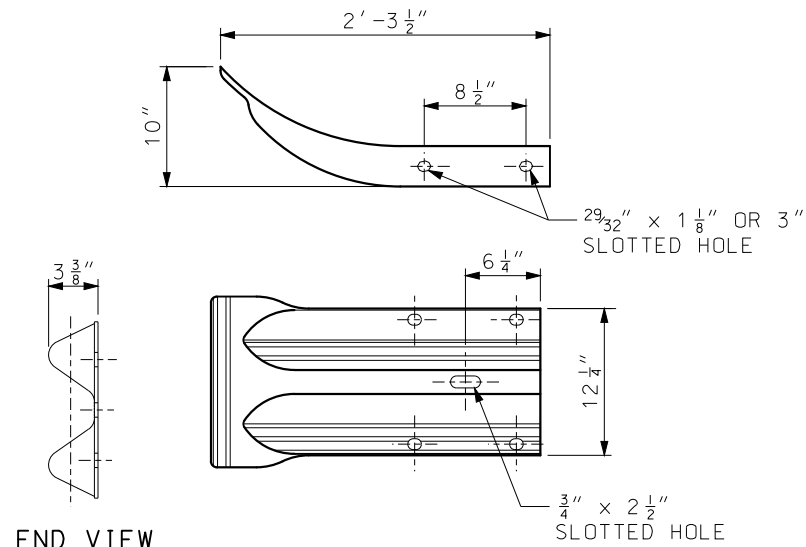
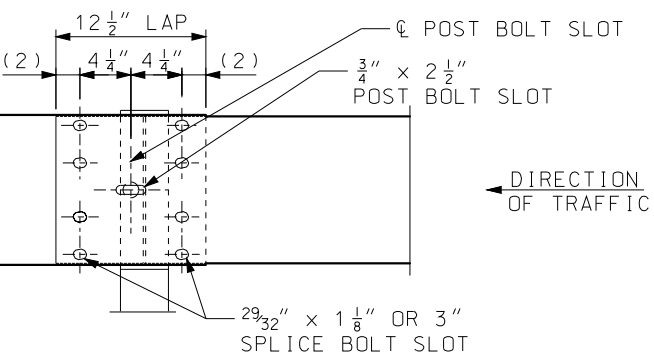
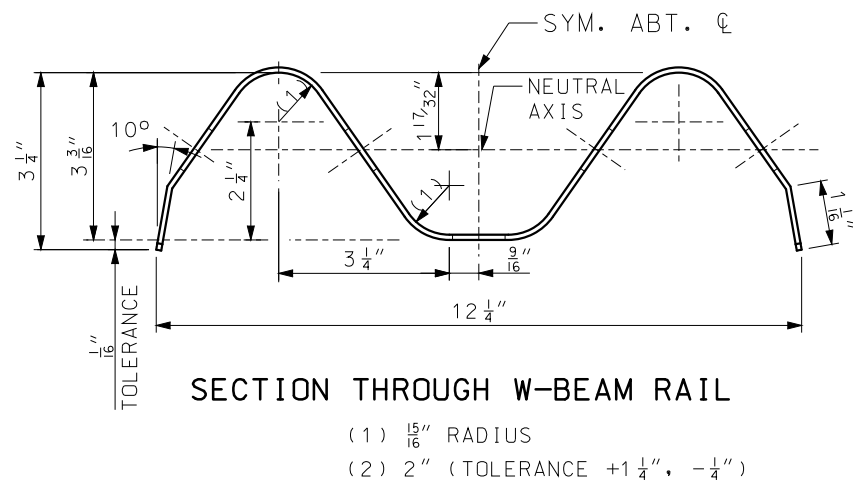
GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE
STD PLAN 903.03.

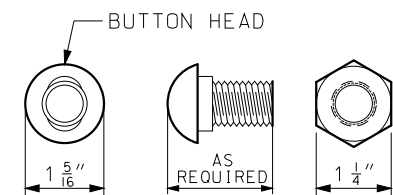
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | GUARDRAIL POST AND BLOCK |
| DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | SHEET NO. 606.00AY 4 OF 7 |



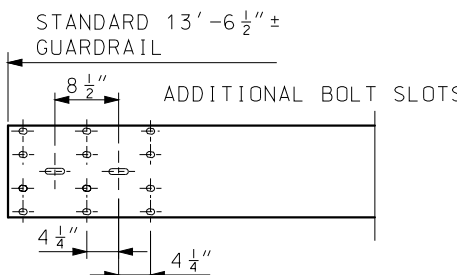
TERMIANL CONNECTOR



THRIE-BEAM SPLICE AT POST

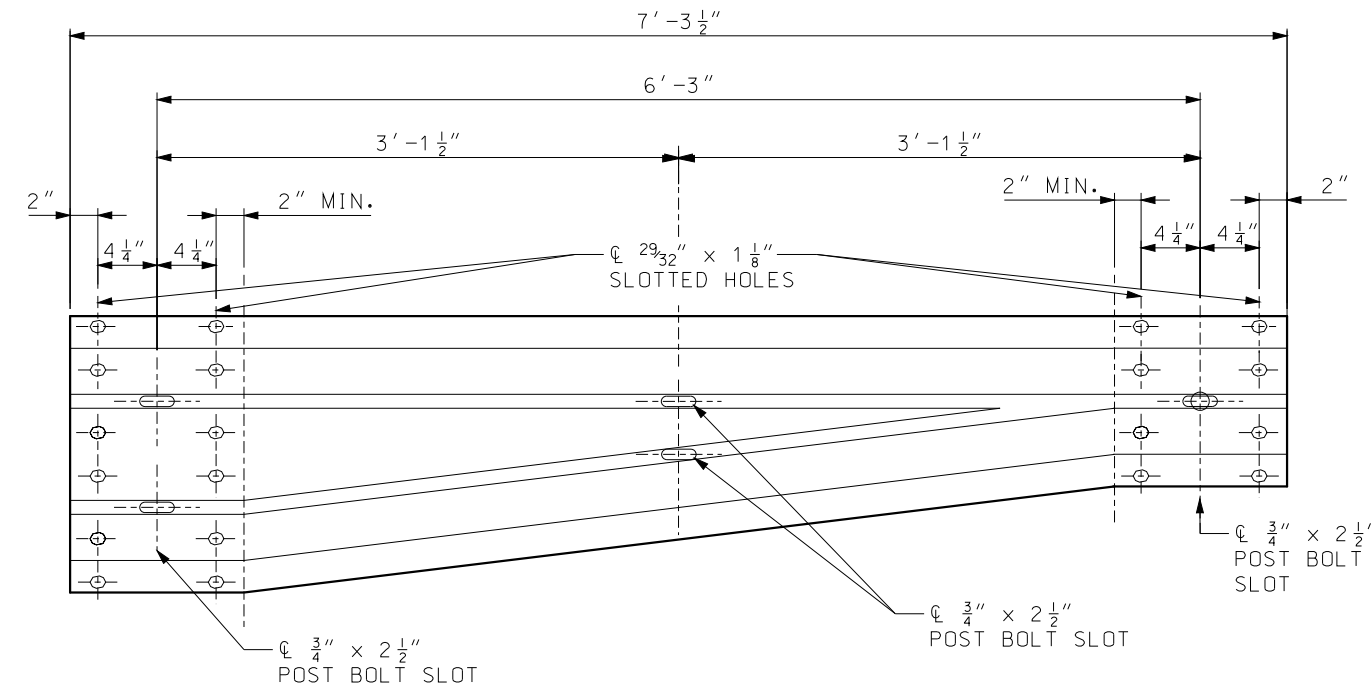
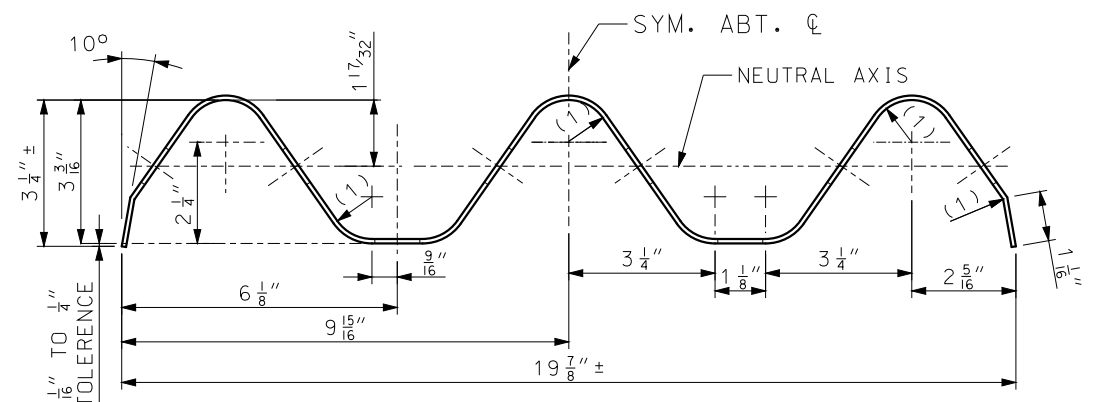


OVAL SHOULDER SHALL BE OF ADEQUATE HEIGHT, LENGTH & SHAPE TO PREVENT TURNING DURING INSTALLATION OR REMOVAL OF BOLT.

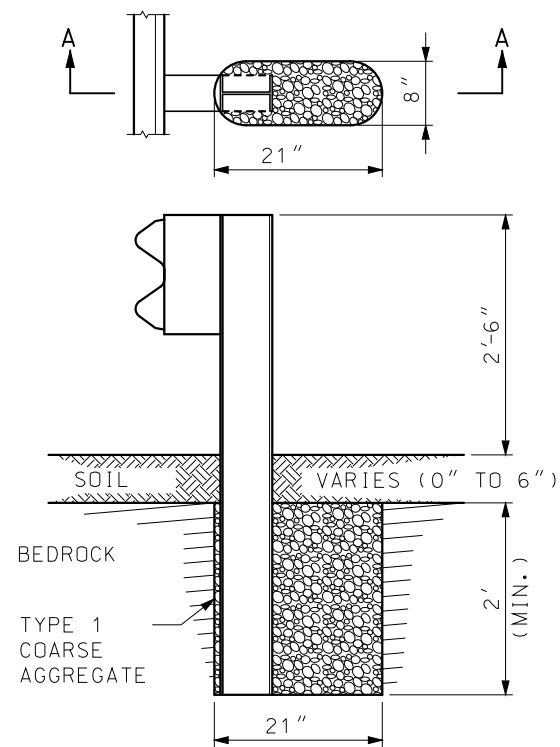


NOTE: PORTIONS OF BEAM WITH UNUSED BOLT SLOTS TO BE LAPPED BEHIND.

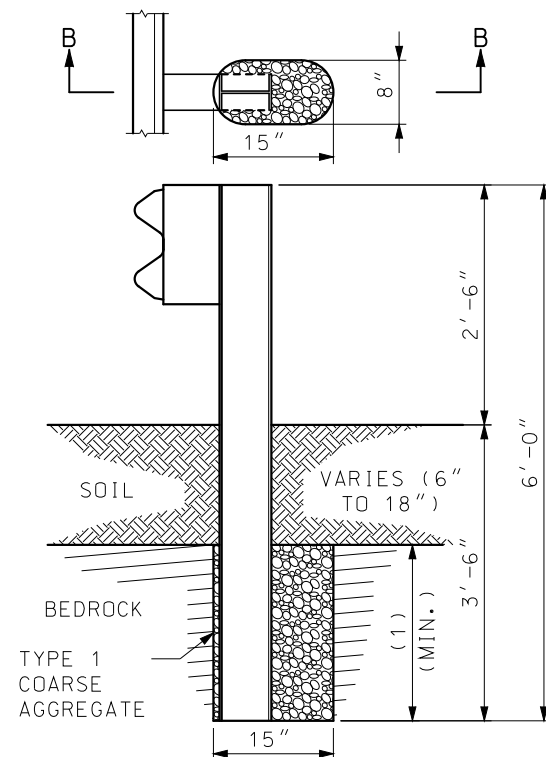
BEAM DETAILS SHOWING LOCATION OF ADDITIONAL BOLT SLOTS NECESSARY TO OBTAIN GUARDRAIL OFFSET.



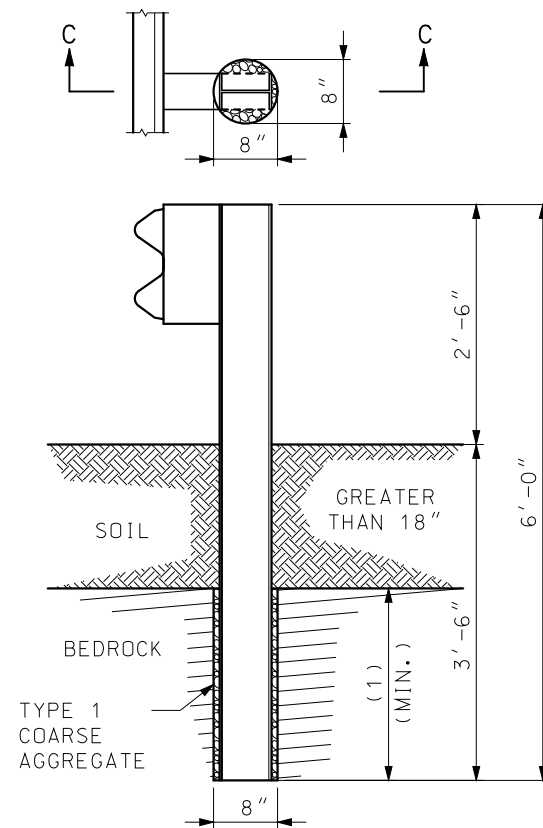
| | | |
|--|---------------------------------------|-------------------------|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | |
| <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>GUARDRAIL RAIL ELEMENTS</p> | |
| <p>DATE EFFECTIVE: 01/01/2017</p> <p>DATE PREPARED: 10/28/2016</p> | <p>606.00AY</p> | <p>SHEET NO. 5 OF 7</p> |



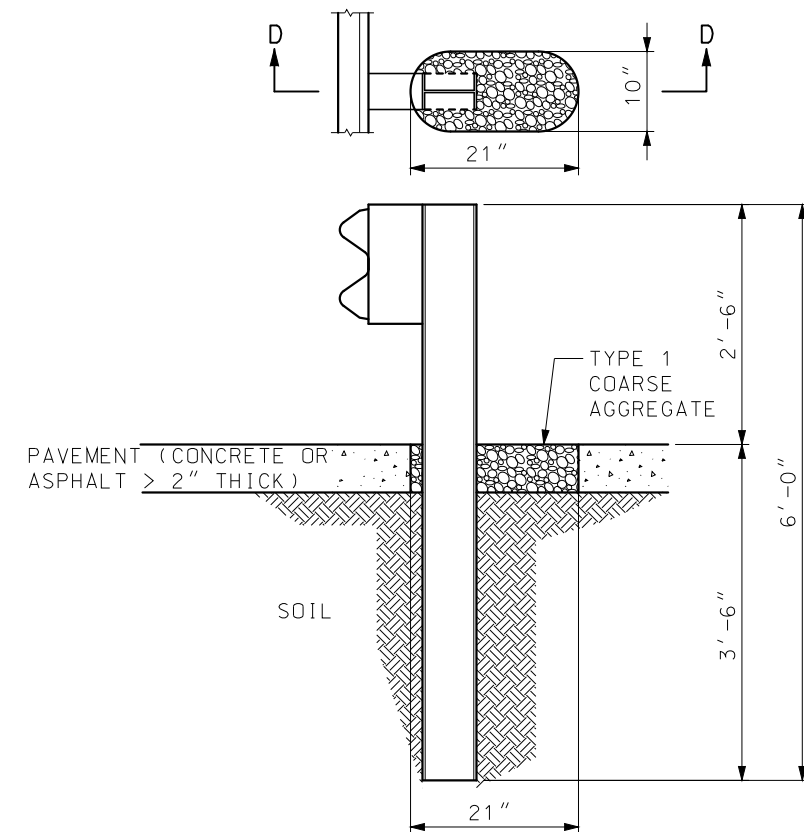
SECTION A-A
ROCK ENCOUNTERED
UP TO 6" BENEATH SURFACE



SECTION B-B
ROCK ENCOUNTERED
6" TO 18" BENEATH SURFACE



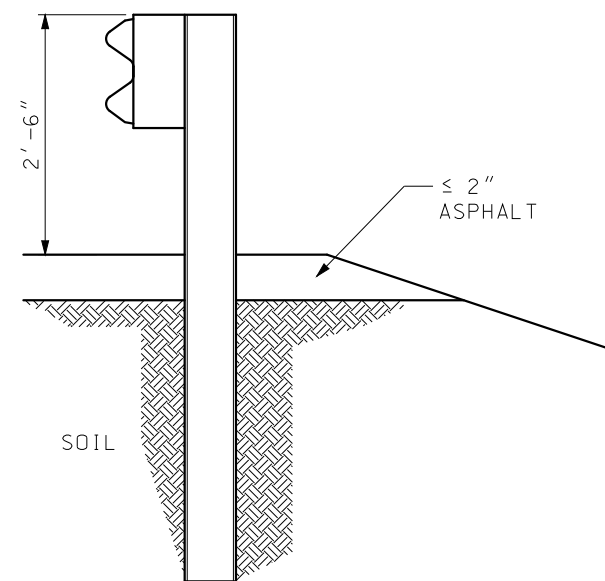
SECTION C-C
ROCK ENCOUNTERED MORE
THAN 18" BENEATH SURFACE



SECTION D-D
SETTING POST THROUGH PAVEMENT
(CONCRETE OR ASPHALT > 2" THICK)

SETTING POST IN SOLID ROCK

(1) MINIMUM ROCK EMBEDMENT IS EQUAL TO
FULL DEPTH POST EMBEDMENT MINUS SOIL
DEPTH.



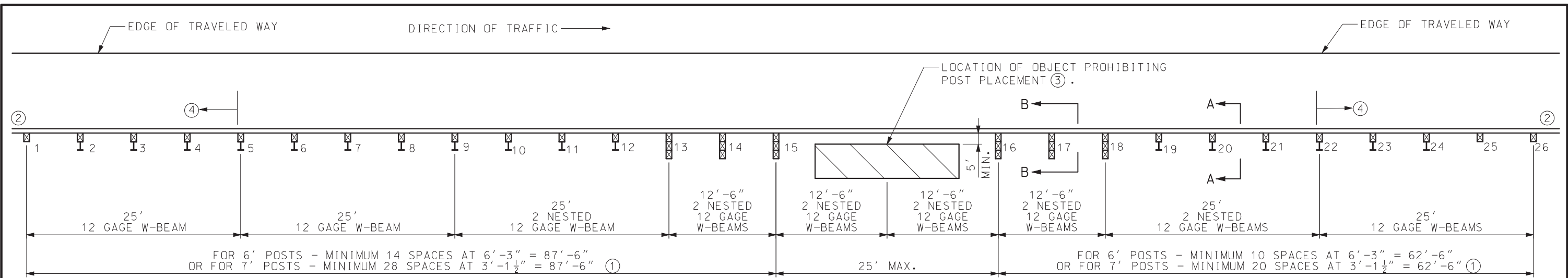
SETTING POST THROUGH ASPHALT $\leq 2"$ THICK

GENERAL NOTES:

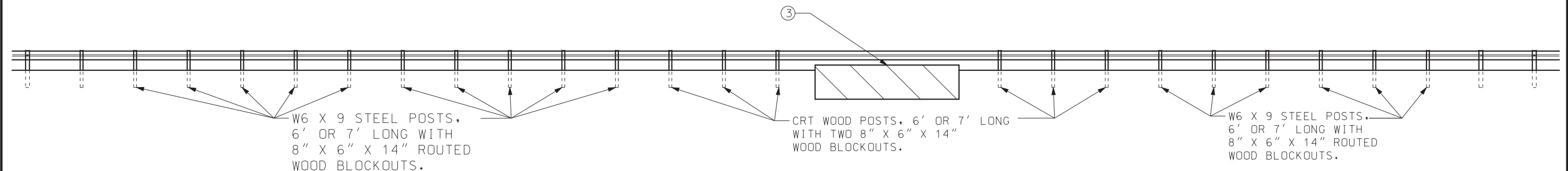
HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT
LESS THAN 4 INCHES GREATER THAN THE MAXIMUM
TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN A MINIMUM 2 FEET
OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT.
REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF
THE STANDARD SPECIFICATIONS.

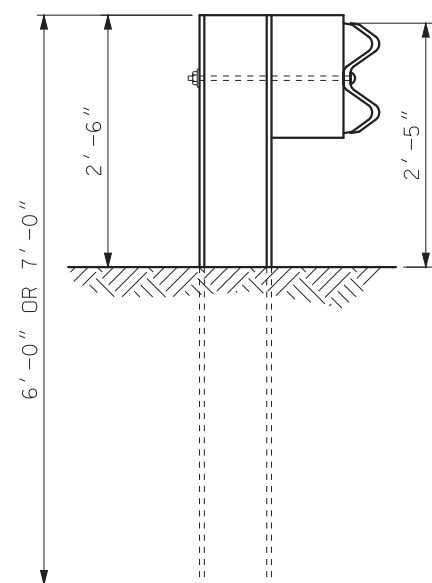
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p align="center">GUARDRAIL SPECIAL INSTALLATIONS</p> |
| DATE EFFECTIVE: 01/01/2017 DATE PREPARED: 10/28/2016 | 606.00AY |
| SHEET NO. 6 OF 7 | |



PLAN

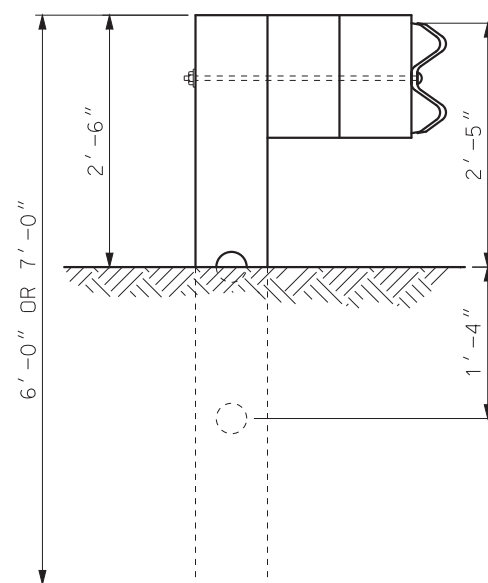


ELEVATION



SECTION A-A

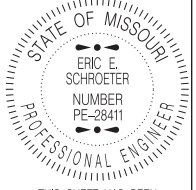
W6 X 9 STEEL POSTS, 6' OR 7' LONG WITH 8" X 6" X 14" ROUTED WOOD BLOCKOUTS POSTS 3 THROUGH 12 AND 19 THROUGH 24.

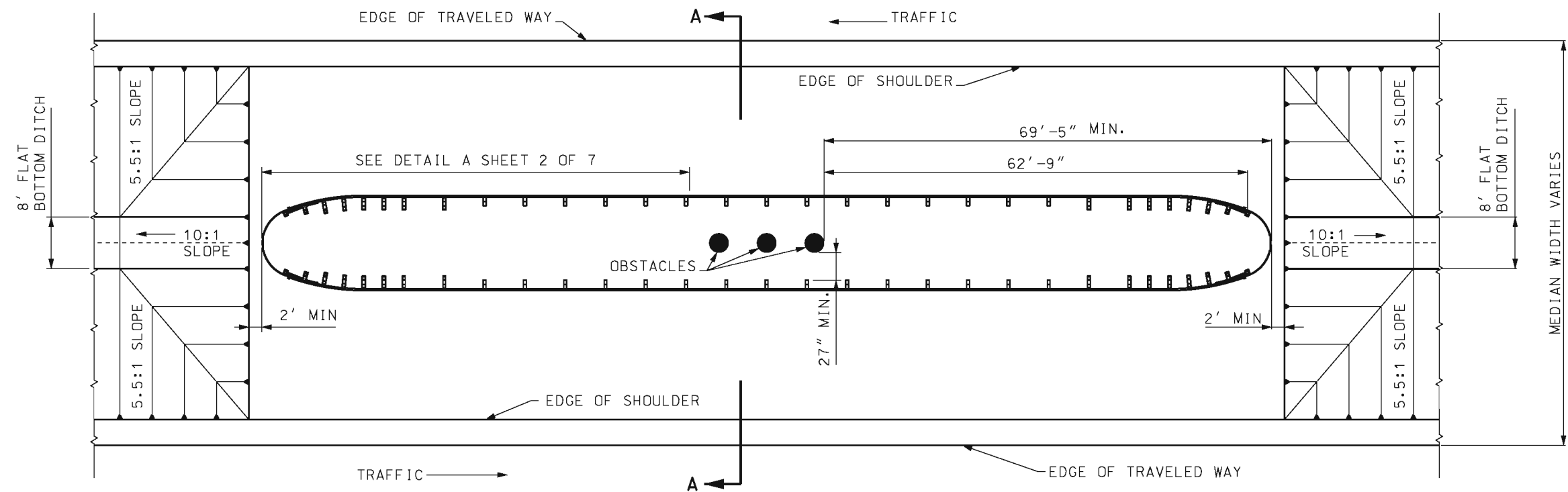


SECTION B-B

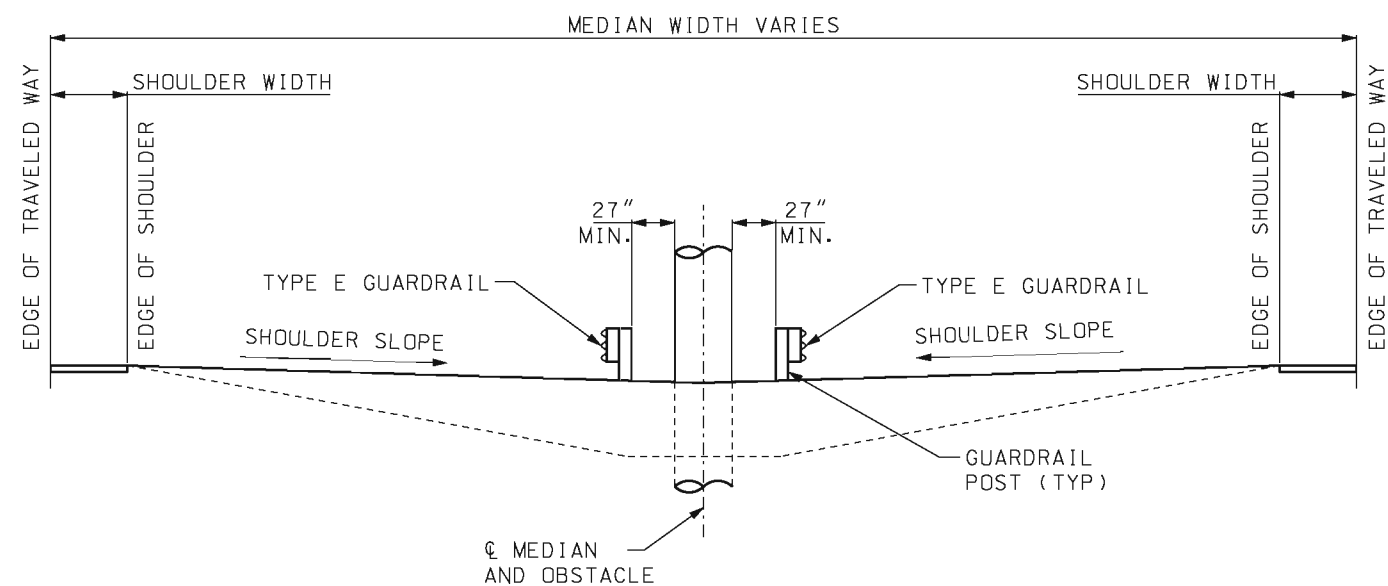
CRT WOOD POSTS, 6' OR 7' LONG WITH TWO 8" X 6" X 14" WOOD BLOCKOUTS POSTS 13 THROUGH 18.

- ① IF LOCATED WITHIN THE CLEAR ZONE OF A TWO-WAY ROADWAY, THE MINIMUM LENGTH IS 87'-6".
- ② ADDITIONAL GUARDRAIL AS REQUIRED, INCLUDING END TREATMENT.
- ③ THE POST MAY BE SKIPPED DUE TO THE PRESENCE OF AN OBSTACLE SUCH AS A CULVERT.
- ④ PLACE END TREATMENT NO CLOSER TO THE SKIPPED POST THAN POSTS 5 AND 22.

| | | |
|--|--|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | GUARDRAIL LONG-SPAN NESTED W-BEAM | |
| DATE EFFECTIVE: 10/01/2017 DATE PREPARED: 8/8/2017 | 606.00AY | SHEET NO. 7 OF 7 |



PIER AT & OF MEDIAN
PLAN VIEW





SECTION A-A

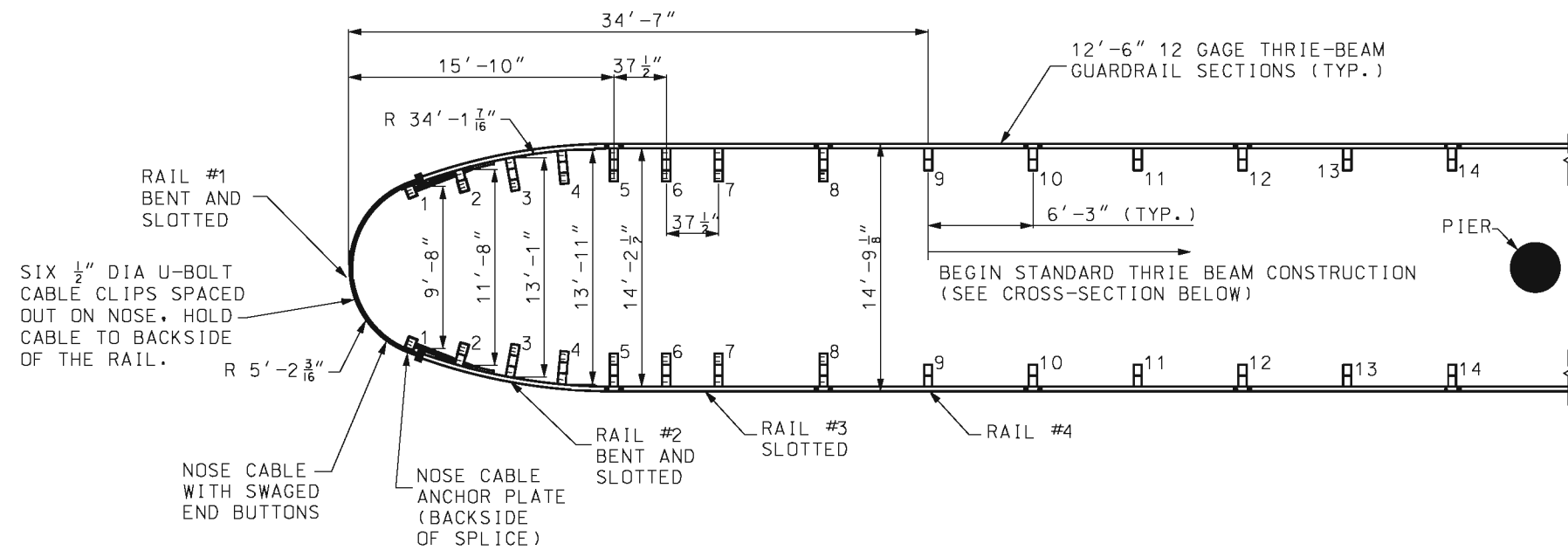
GENERAL NOTES:

WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E GUARDRAIL.

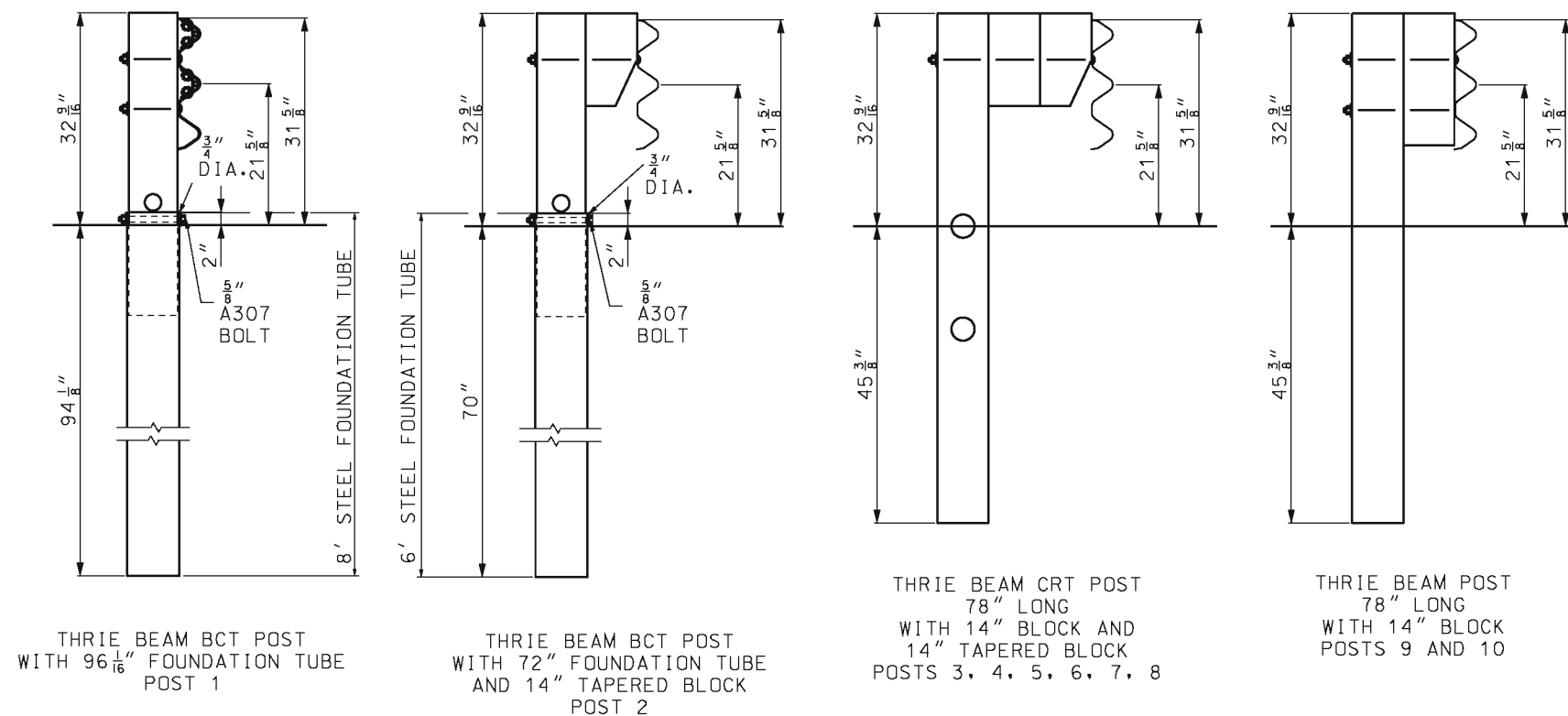
THE BULLNOSE GUARDRAIL PAY ITEM INCLUDES THE STRUCTURE BETWEEN POST 10 AND THE NOSE. THE REMAINING GUARDRAIL WILL BE PAID FOR AS STANDARD GUARDRAIL ITEMS.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

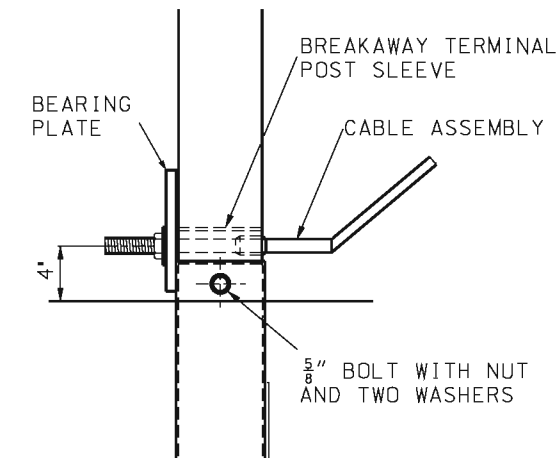
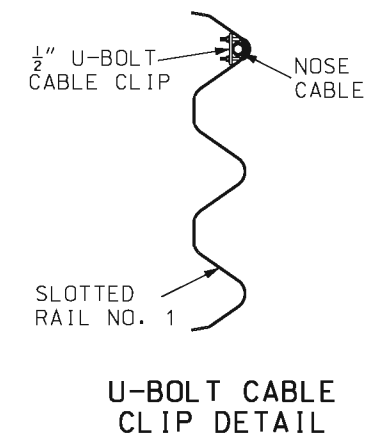
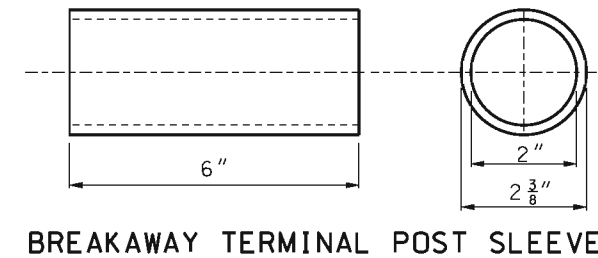
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM |
| DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012 | 606.01F |
| SHEET NO. 1 OF 9 | |



DETAIL A



POST DETAILS

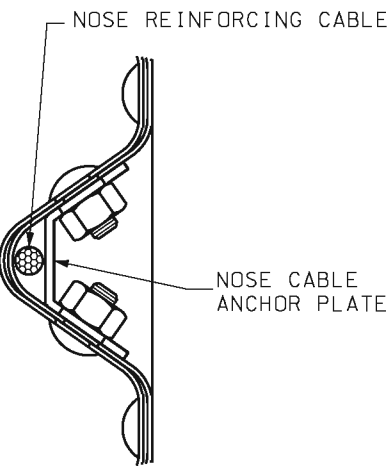


GENERAL NOTE:

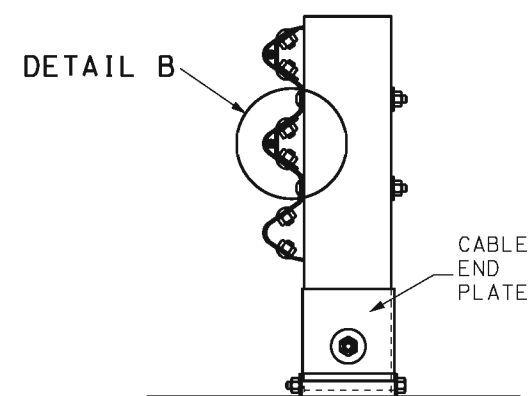
RAILS NUMBERS 1, 2, 3 AND 4 ARE TYPE E GUARDRAIL.
RAIL NUMBER 4 IS A STANDARD THRIE BEAM, NOT SLOTTED.

| | |
|--|--|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM</p> |
| <p>DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012</p> | <p>606.01F</p> |
| <p>SHEET NO. 2 OF 9</p> | |

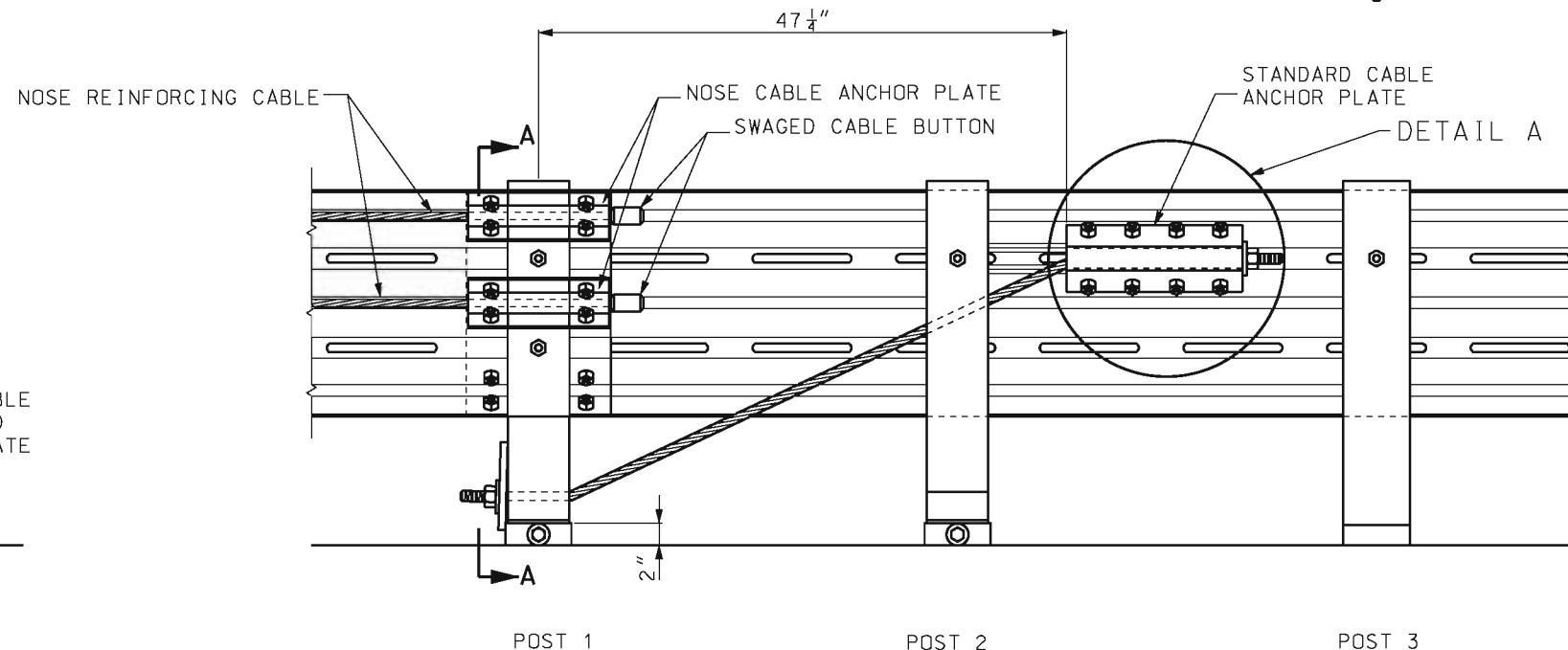
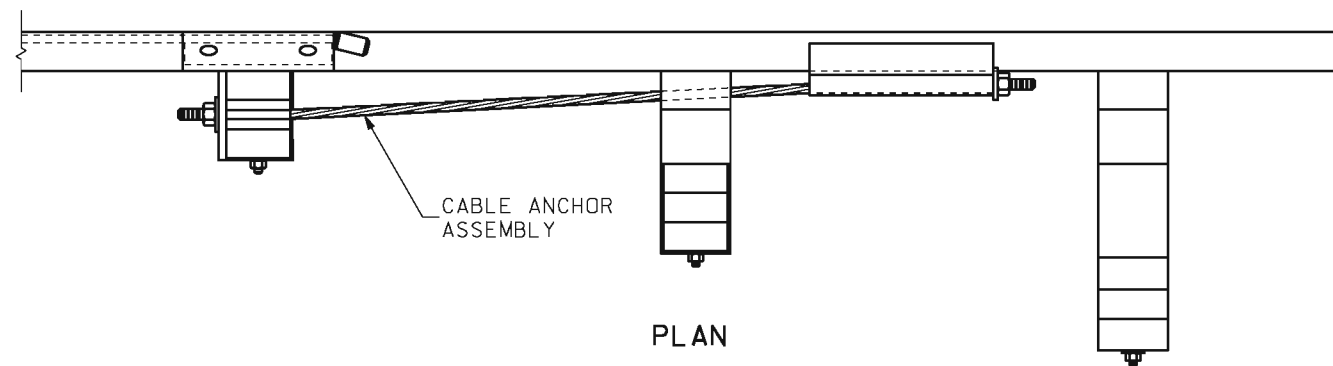
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



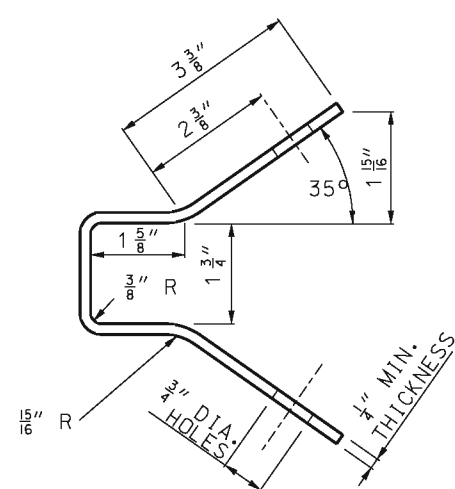
DETAIL B



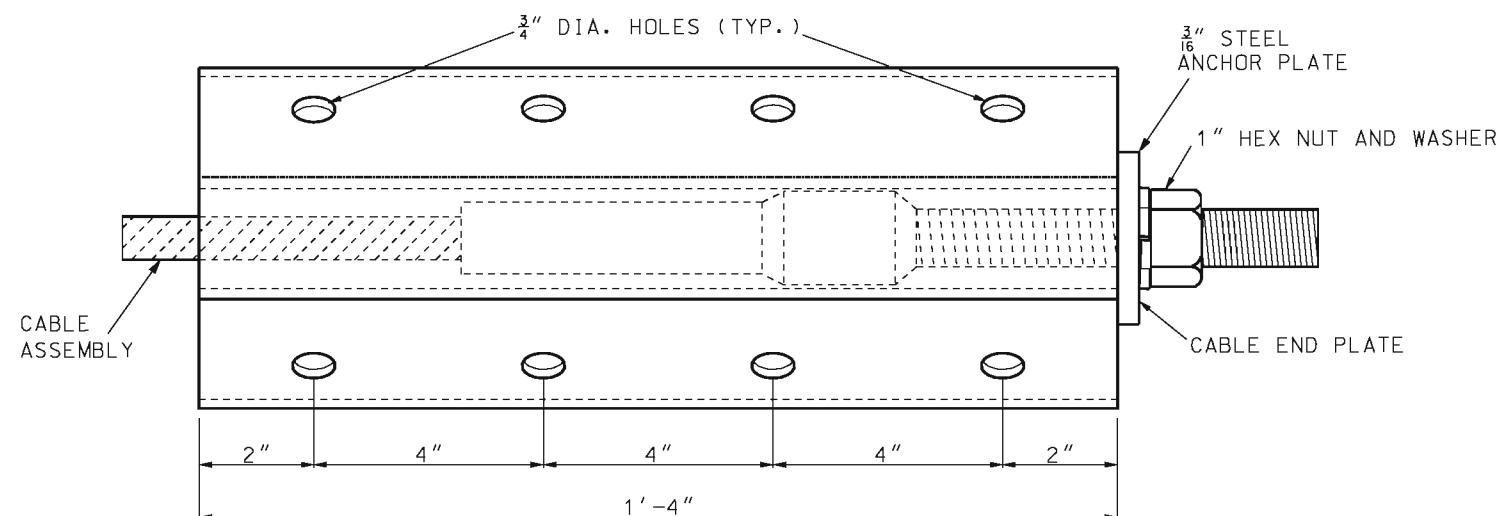
SECTION A-A





ELEVATION
CABLE ANCHOR ASSEMBLY

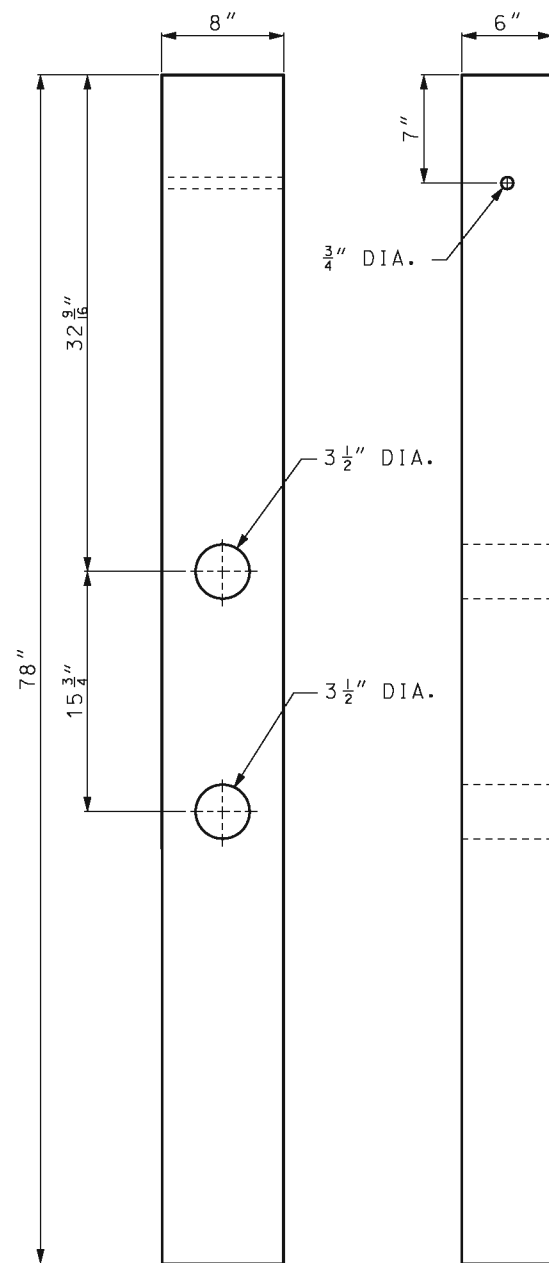


END VIEW

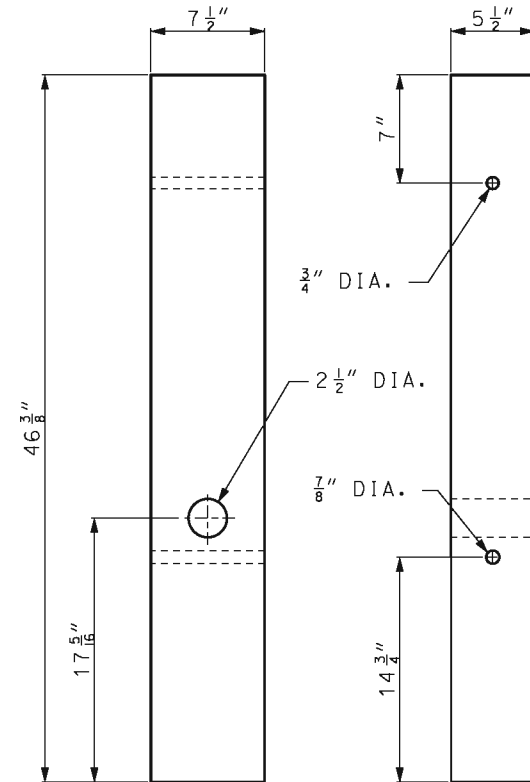


DETAIL A

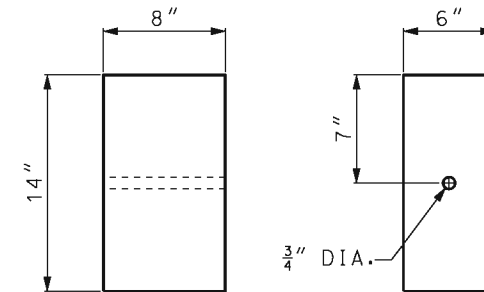
| | | |
|--|---|-----------------------|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | |
|  <p>STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>MEDIAN PIER PROTECTION</p> <p>BULLNOSE GUARDRAIL SYSTEM</p> <p>CABLE ANCHOR</p> | |
| | <p>DATE EFFECTIVE: 08/01/2012</p> <p>DATE PREPARED: 7/27/2012</p> | <p>606.01F</p> |



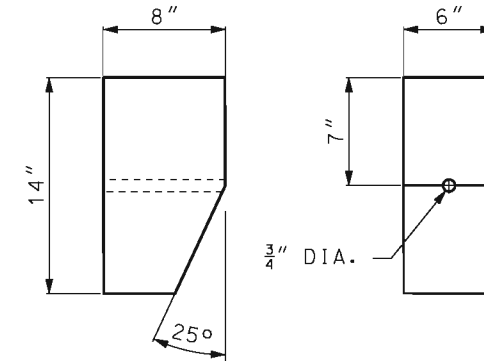
THRIE BEAM CRT POSTS



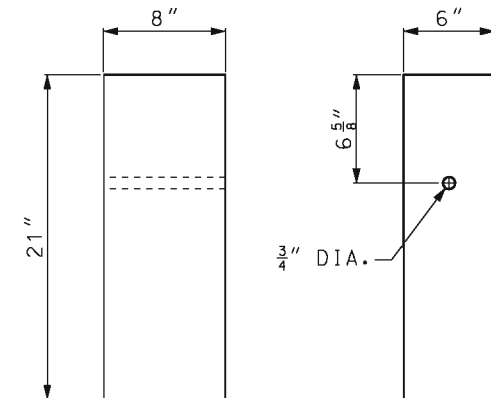
THRIE BEAM ANCHOR POSTS





POSTS 2 THROUGH 8
STANDARD BLOCKS

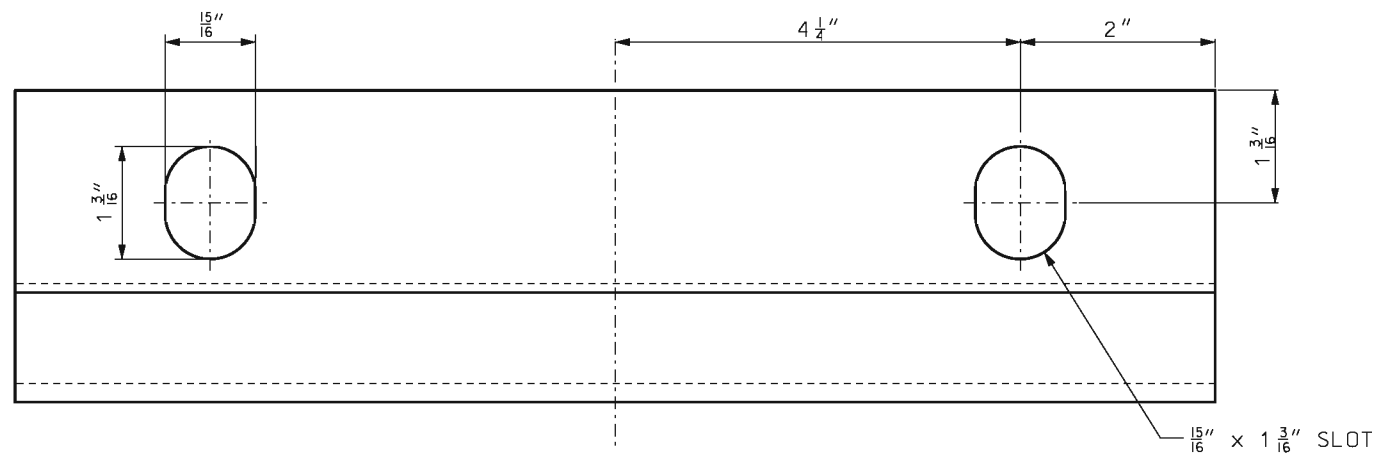
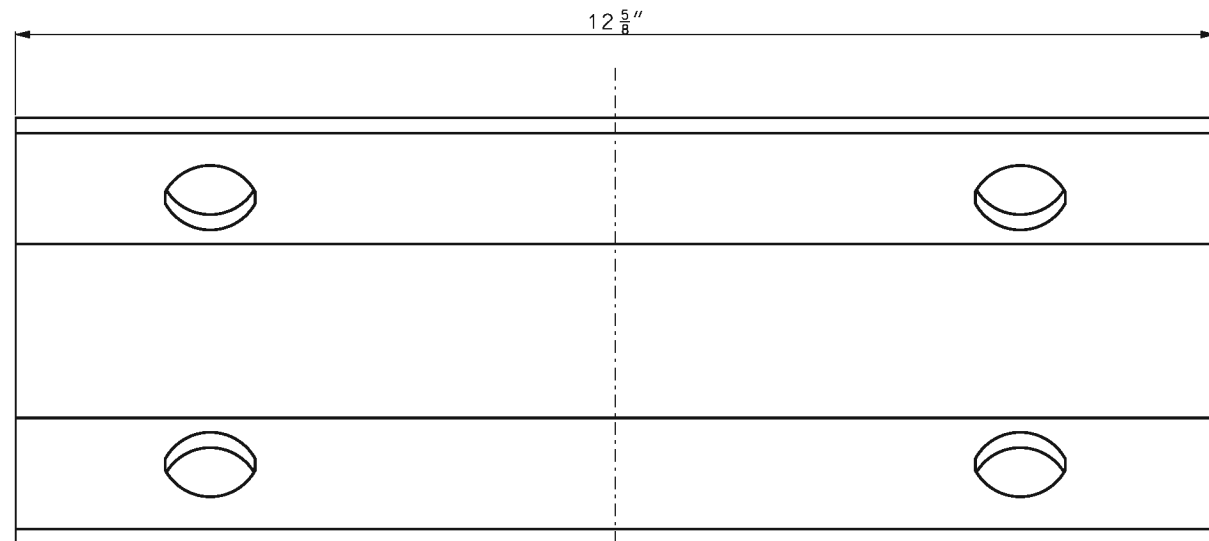


TAPERED BLOCK

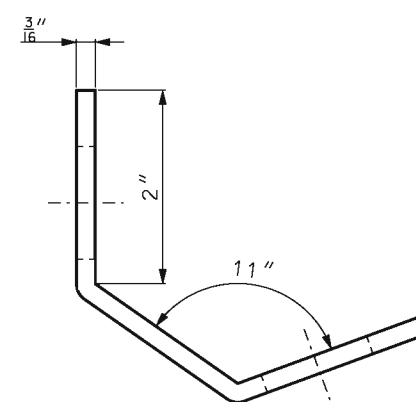
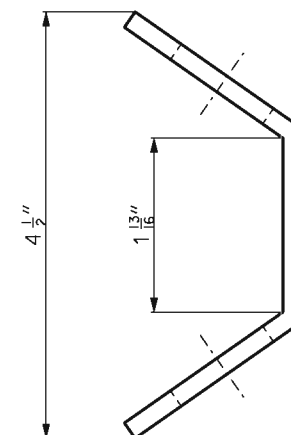


BLOCKS FOR POSTS 9 AND 10
STANDARD BLOCKS

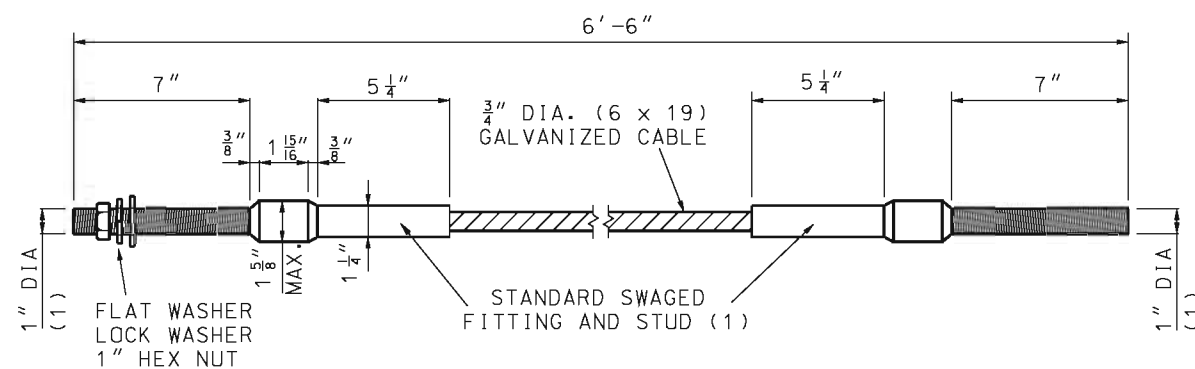
| | | |
|--|---|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM POST AND BLOCKS | |
| | DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012 | 606.01F |



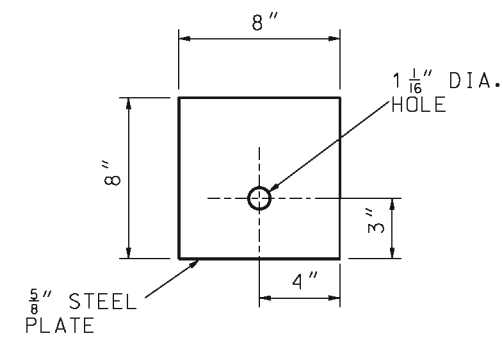
STEEL PLATE, A306
12 5/8" x 5 7/8" x 3/16"





(1) STUD, THREADED ENTIRE LENGTH.

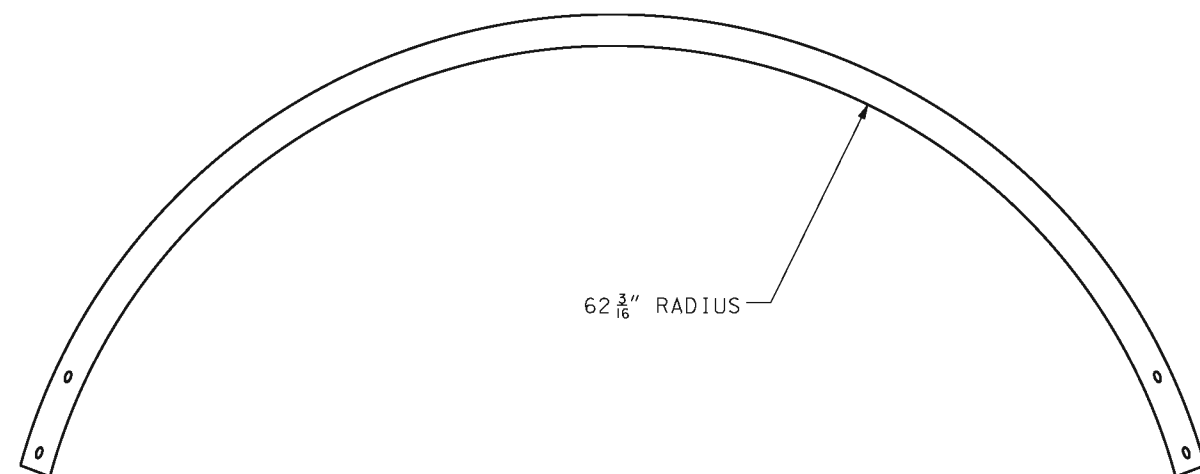


DETAIL OF CABLE ASSEMBLY

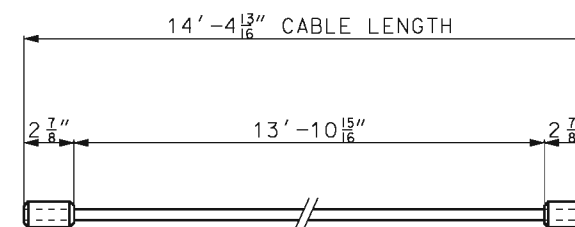


DETAIL OF
STEEL BEARING PLATE

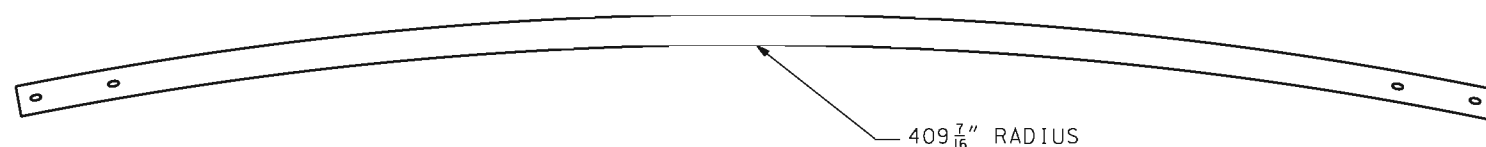
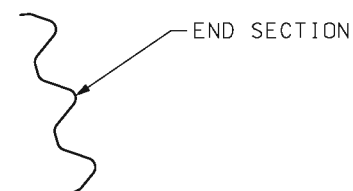
| | | |
|---|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small> | MEDIAN PIER PROTECTION BULLNOSE GUARDRAILS SYSTEM PLATES AND CABLE ASSEMBLY | |
| | DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012 | 606.01F |



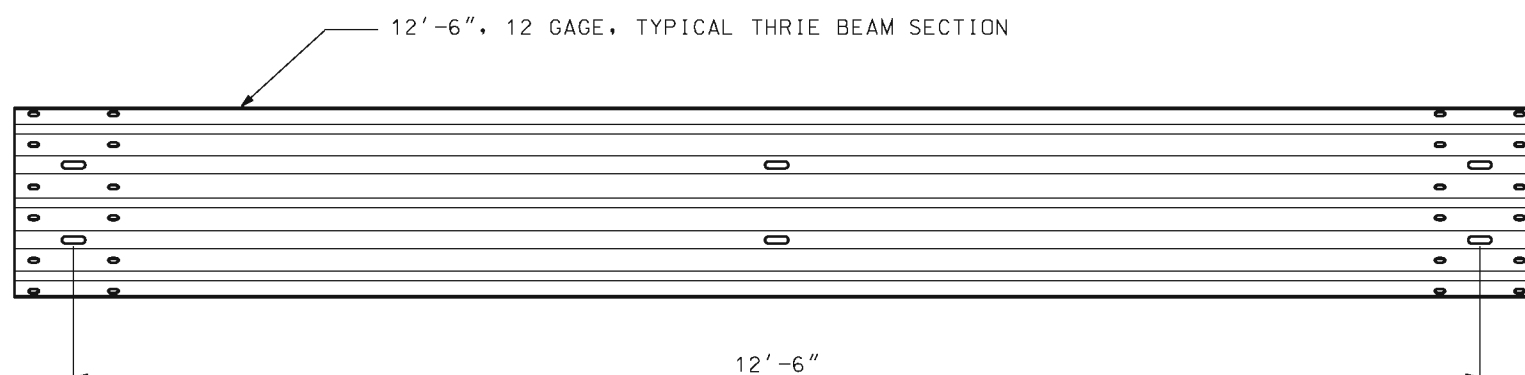
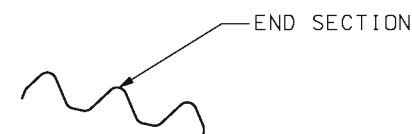
TOP VIEW, RAIL #1



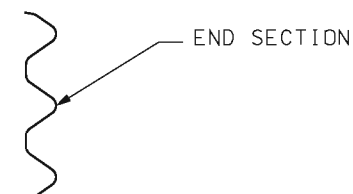
"COLD TUFF" BUTTON, S-409 SIZE NO. 12 SB 2 7/8"
STOCK NO. 1040395 FOR 5/8" DIA (6 x 25) WIRE ROPE
(OR ANY SIMILARLY SIZED SWAGE-GRIP BUTTON FERRULES)





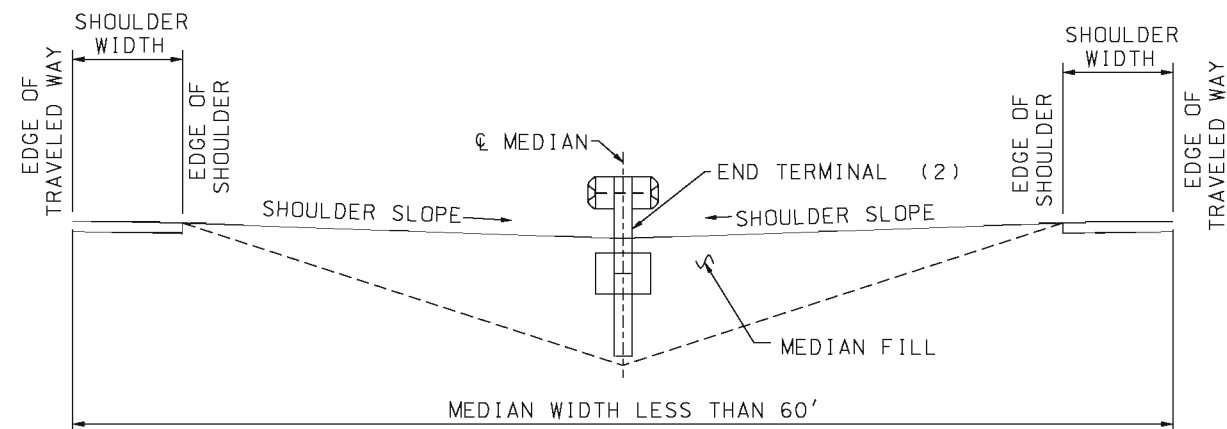
TOP VIEW, RAIL #2



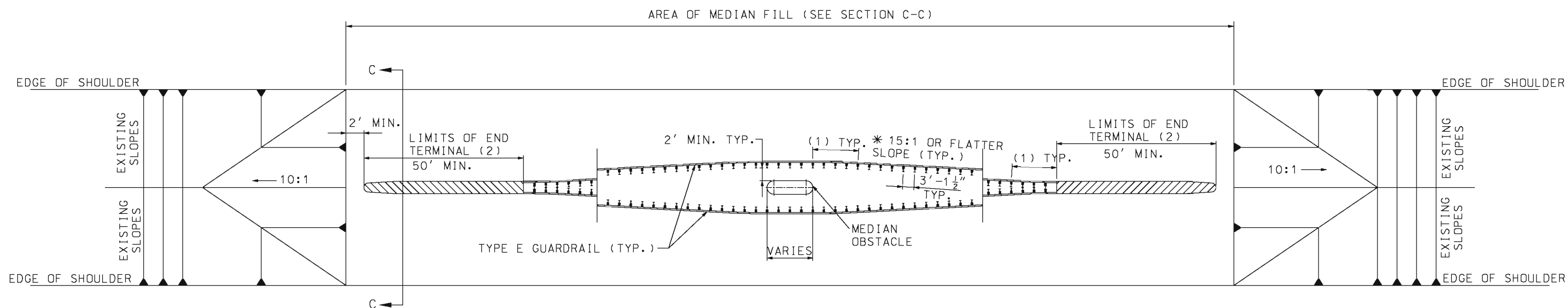
FRONT VIEW (UNBENT)



| | | |
|--|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <p>STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | MEDIAN PIER PROTECTION BULLNOSE GUARDRAIL SYSTEM THRIE BEAM AND CABLE LENGTH | |
| | DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012 | 606.01F |





SECTION C-C

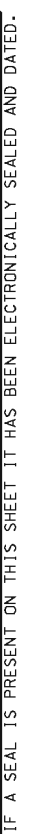


- (1) TYPE E GUARDRAIL 12'-6" IN LENGTH AND FACTORY FORMED TO THE REQUIRED RADIUS.
- (2) PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR ANY TRANSITION SECTIONS, BACKUP ASSEMBLIES, OR OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.
- * VARY SLOPE NO STEEPER THAN 15:1 TO UTILIZE A FULL 12.5' LENGTH OF GUARDRAIL WHEN ATTACHING TO THE CRASHWORTHY END TERMINAL.

GENERAL NOTES:

TYPE B CRASHWORTHY END TERMINAL SHALL BE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMENDATIONS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TYPE E MEDIAN PIER PROTECTION</p> <p>MEDIAN LESS THAN 60'</p> |
| DATE EFFECTIVE: 08/01/2012 DATE PREPARED: 7/27/2012 | <p>606.01F</p> |
| SHEET NO. 8 OF 9 | |

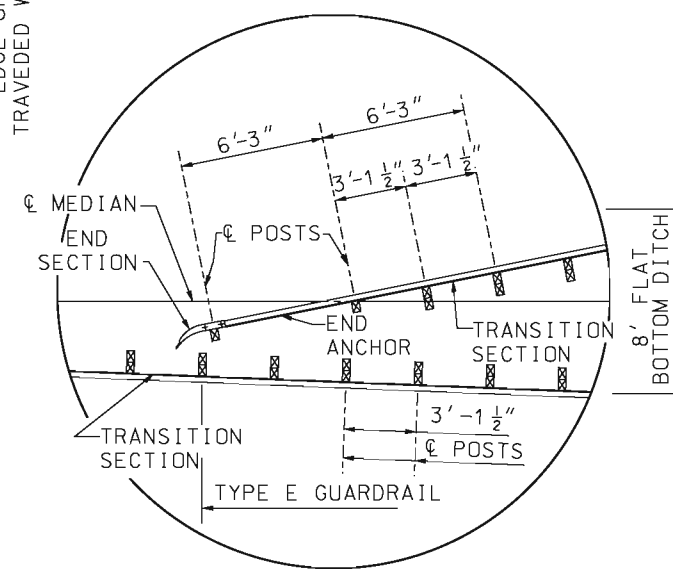


- (1) TYPE E GUARDRAIL IN THIS REGION SHALL BE 12' 6" IN LENGTH AND FACTORY FORMED TO A 75' RADIUS.
- (2) TYPE A NON-FLARED CRASHWORTHY END TREATMENT.



WOOD POSTS AND WOOD BLOCKS MAY BE USED ON TYPE E
GUARDRAIL. END ANCHOR SECTION TO BE USED ON
TERMINAL END OF TYPE E GUARDRAIL.

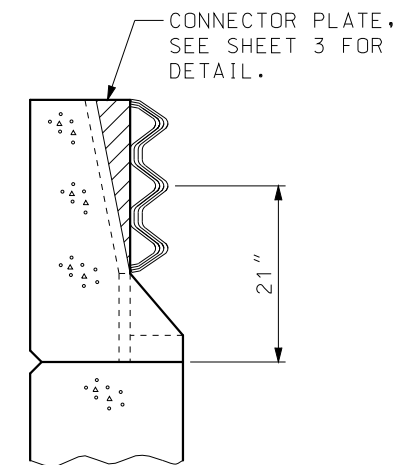
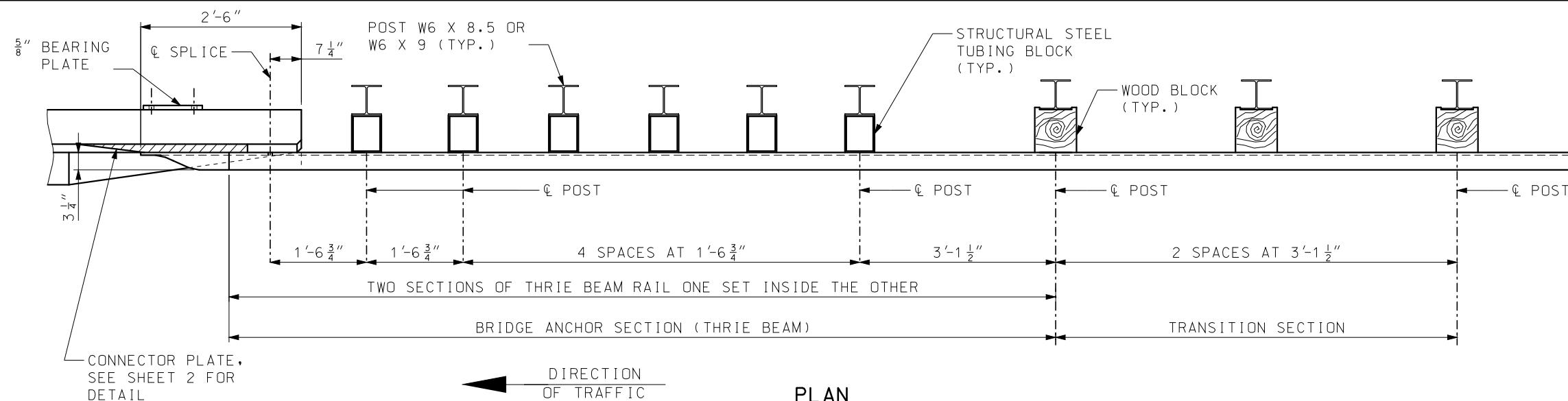
END ANCHOR TO BE LOCATED EYOND THE LONGITUDINAL
LIMITS OF TYPE A NON-FLARED CRASHWORTHY END
TERMINAL.

TYPE A NON-FLARED CRASHWORTHY END TERMINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

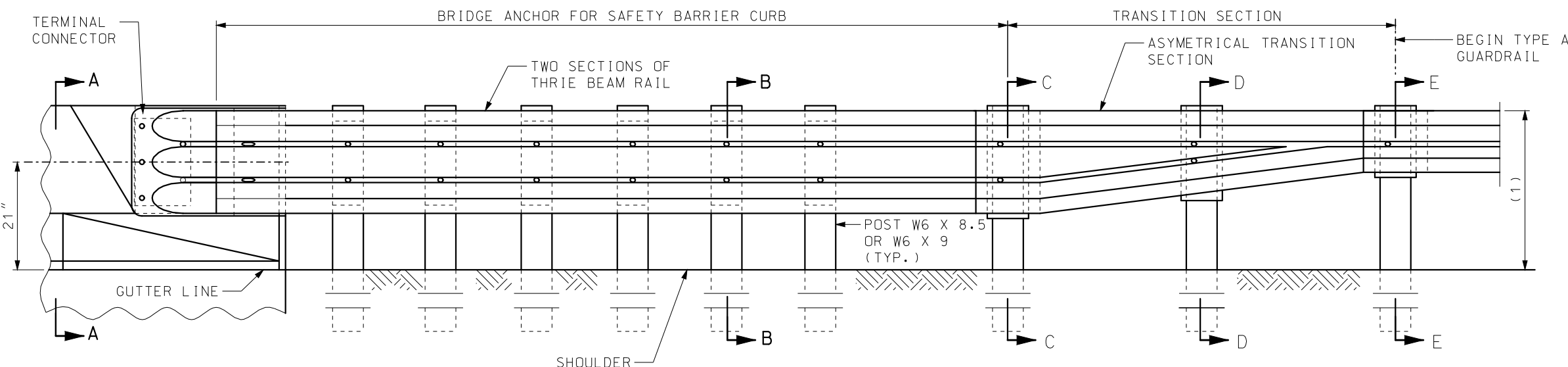


DETAIL A

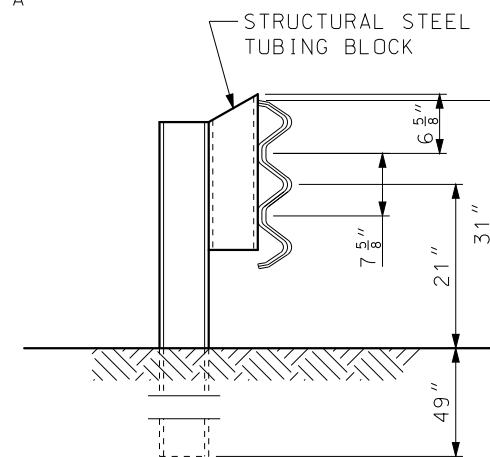
| | | | |
|---|--|--|---------------------------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | <p align="center">TYPE E MEDIAN PIER PROTECTION</p> <p align="center">60' MEDIAN OR GREATER</p> | |
| THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | | DATE EFFECTIVE: <u>08/01/2012</u> DATE PREPARED: <u>7/27/2012</u> | SHEET NO. 606.01F 9 OF 9 |



SECTION A-A

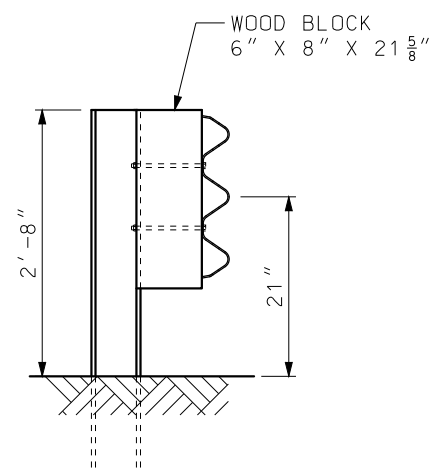


PART SECTION THRU SLAB AT END OF WING

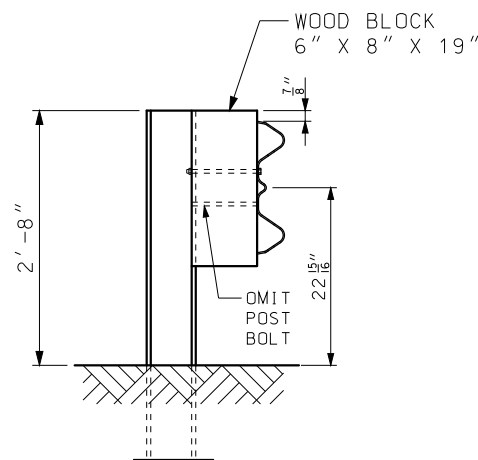


SECTION B-B

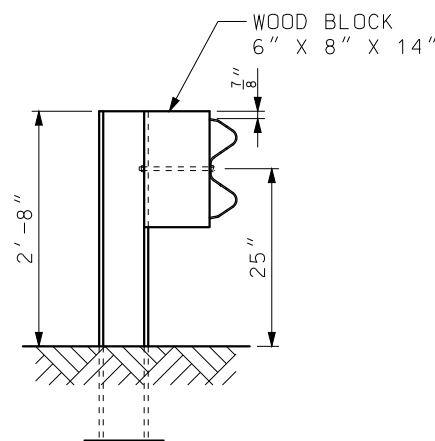
(1) TRANSITION FROM 31" TO 29" HEIGHT OVER NEXT TWO UPSTREAM 12'-6" W-BEAM RAILS.



SECTION C-C





SECTION D-D

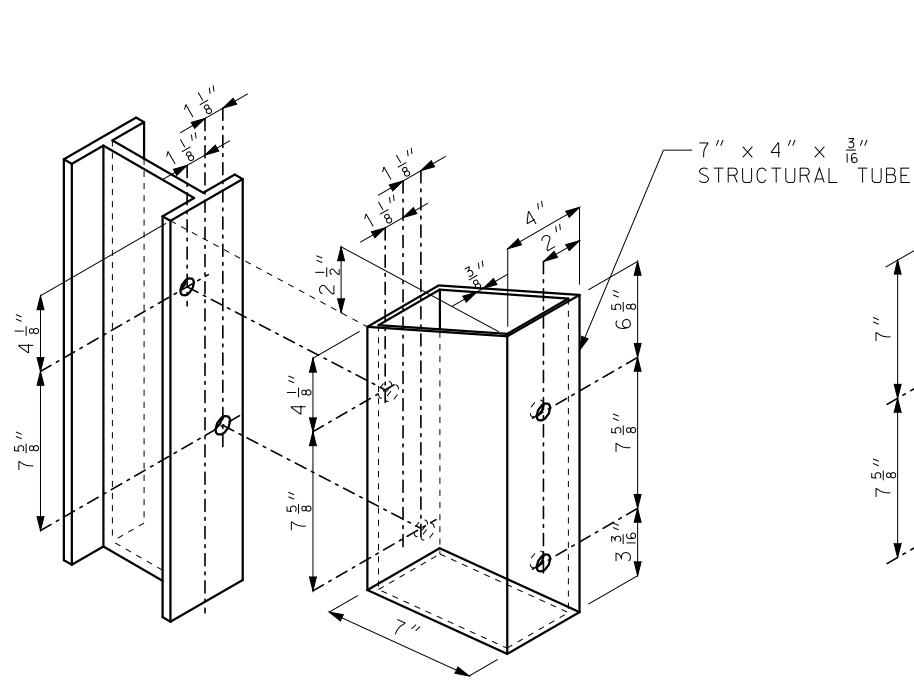


SECTION E-E

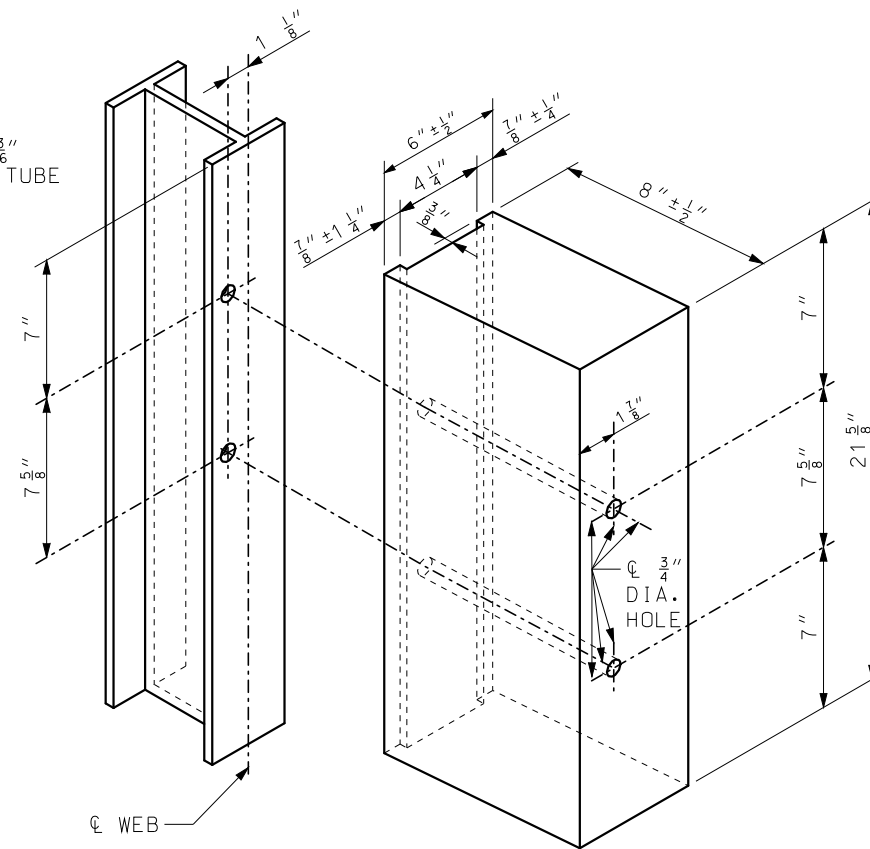
NOTES:

FOR GENERAL NOTES, SEE SHEET 3 OF 6
FOR DETAILS OF BLOCK ON STEEL POSTS, SEE SHEET 2 OF 6.

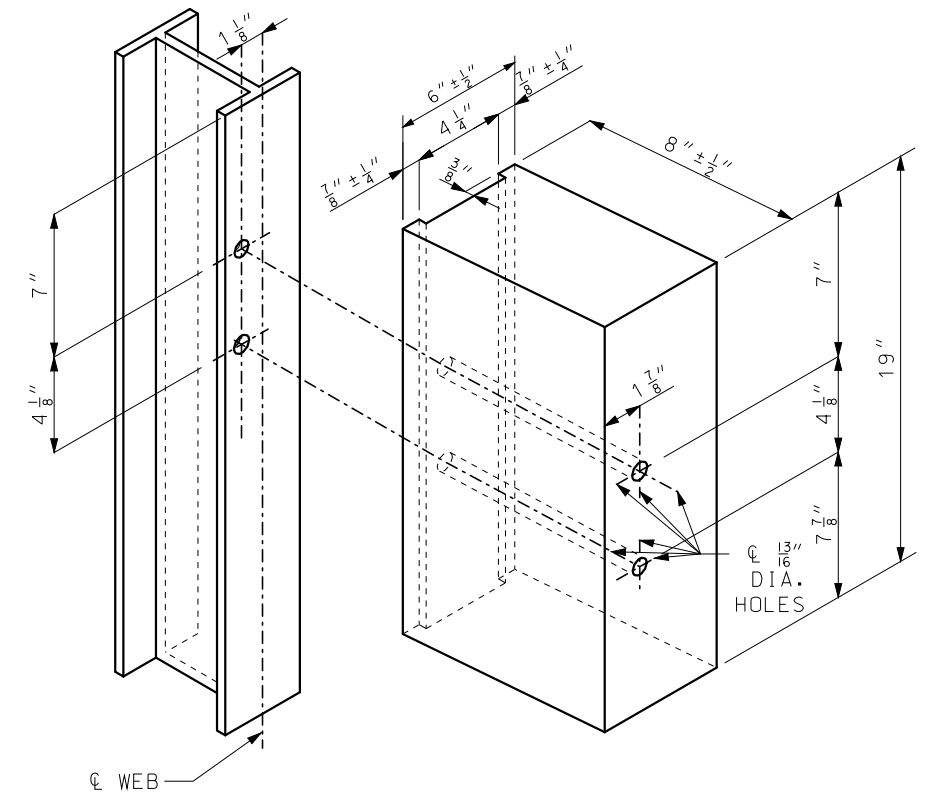
| | | |
|--|---|---------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE | |
| | DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 606.22U |



STRUCTURAL STEEL TUBING BLOCK DETAIL

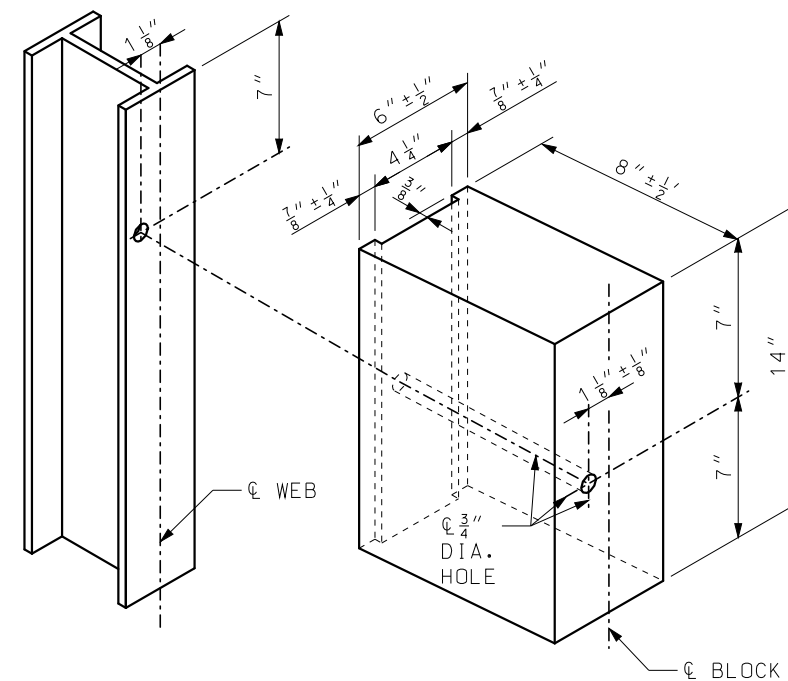


21 ⁵/₈ " WOOD BLOCK DETAIL


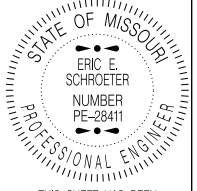


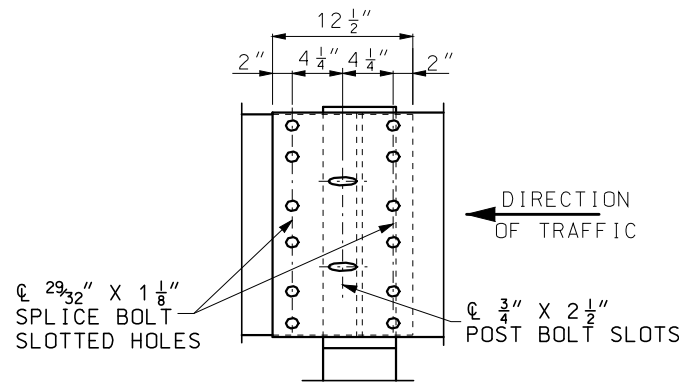
19 " WOOD BLOCK DETAIL

ALL HOLES DRILLED OR PUNCHED ¹³/₁₆ " DIA.



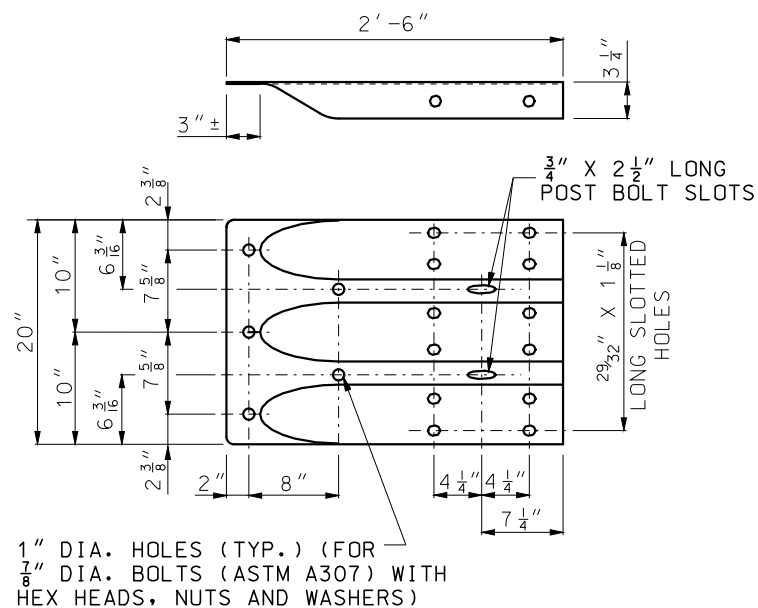
14 " WOOD BLOCK DETAIL

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 606.22U |
| SHEET NO. 2 OF 6 | |

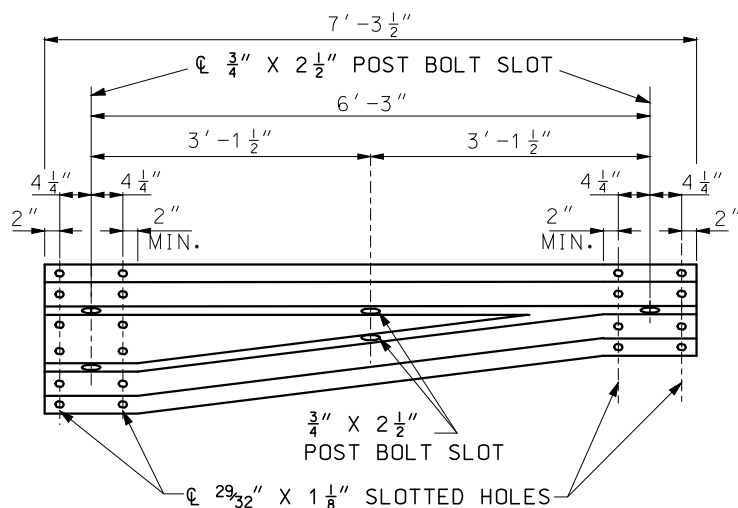


THRIE BEAM RAIL SPLICE AT POST

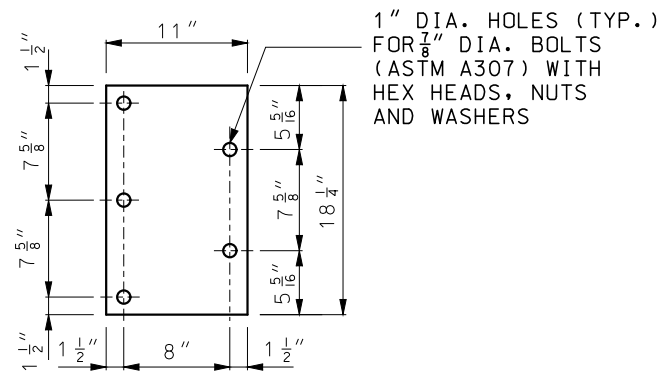
(1) THE CONTRACTOR MAY, AT HIS OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.



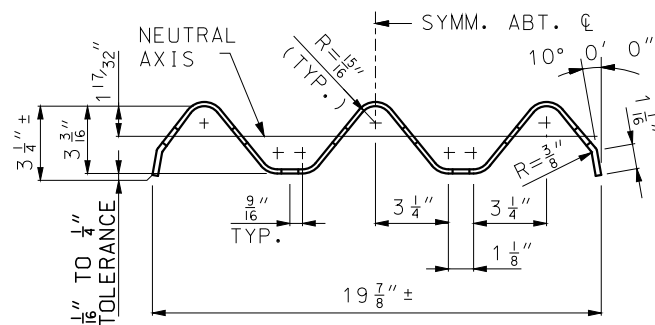
TERMINAL CONNECTOR



ASYMMETRICAL TRANSITION SECTION



5/8" BEARING PLATE



SECTION THROUGH THRIE BEAM RAIL

GENERAL NOTES:

DESIGN BASED ON NCHRP REPORT 350 TEST LEVEL 3.

THE THRIE BEAM RAIL, TERMINAL CONNECTOR AND THE TRANSITION SECTION FOR THE BRIDGE ANCHOR SECTION SHALL BE MADE OF STEEL AND SHLL BE 12 GAGE.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

STRUCTURAL TUBING BLOCK SHALL BE FABRICATED FROM ASTM A500 GRADE B STEEL AND GALVANIZED.

USE 5/8" BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = 3/8" MIN.).


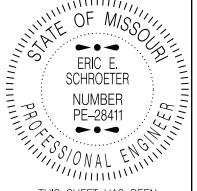
THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.

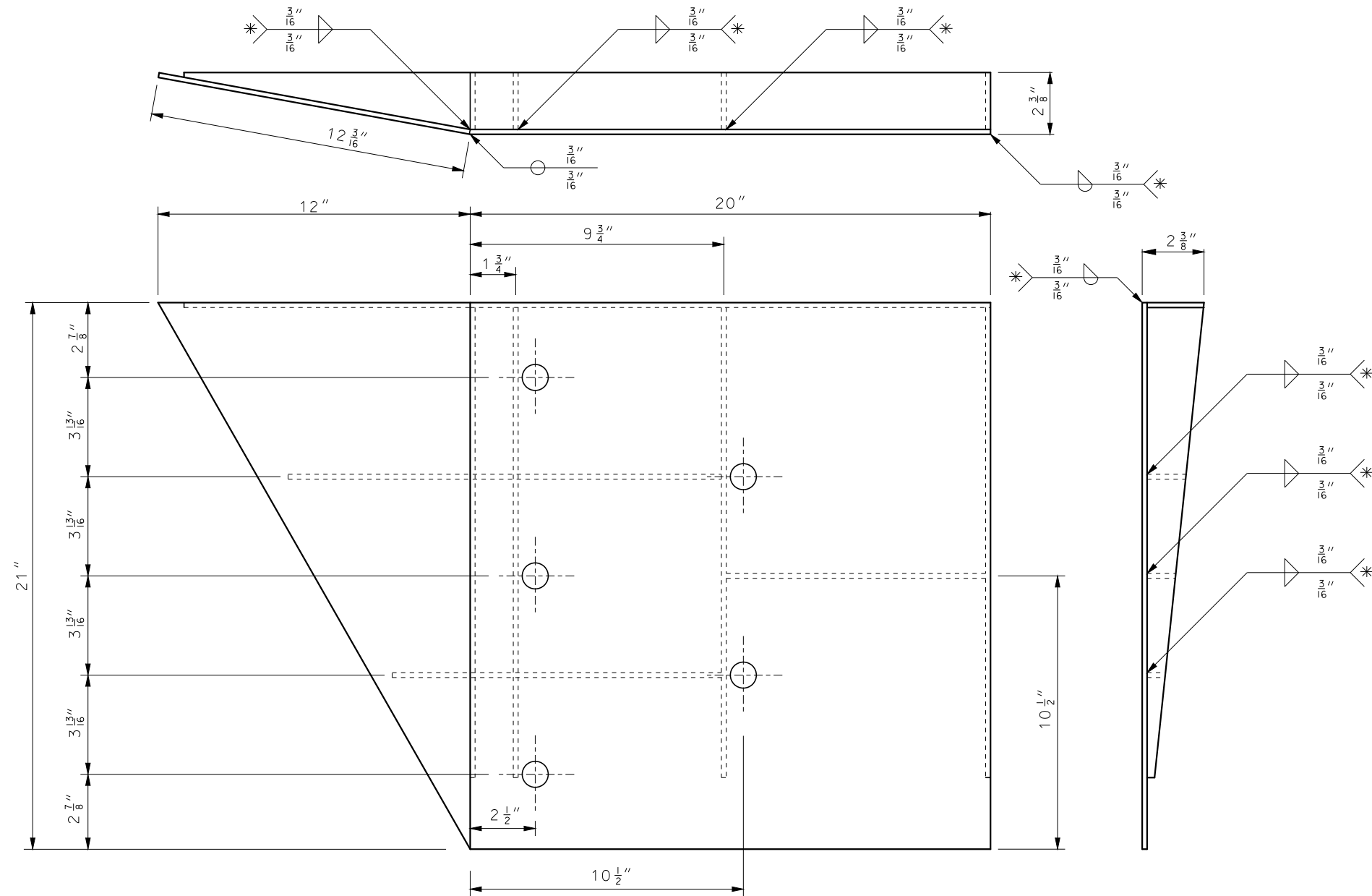
ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

SEE STANDARD PLAN 606.00 FOR DETAILS NOT SHOWN.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COplete IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

THE COST OF FURNISHING FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (SAFETY BARRIER CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

| | | | |
|--|---------|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE | |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 606.22U | SHEET NO. 3 OF 6 | |



WELDING INSTRUCTION

* ALL FILLET WELDS SHALL BE 1" LONG SPACED AT 2".

GENERAL NOTES:

COVER PLATE PANELS ARE 4. $\frac{3}{16}$ " THICK.

ALL STIFFENERS ARE $\frac{1}{4}$ " THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

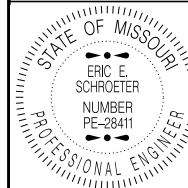
FOR GALVANIZED REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".



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THIS SHEET HAS BEEN
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ELECTRONICALLY.

**BRIDGE ANCHOR SECTION
SAFETY BARRIER CURB ON BRIDGE
(CONNECTOR PLATE DETAIL)**

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

606.22U

SHEET NO.
4 OF 6

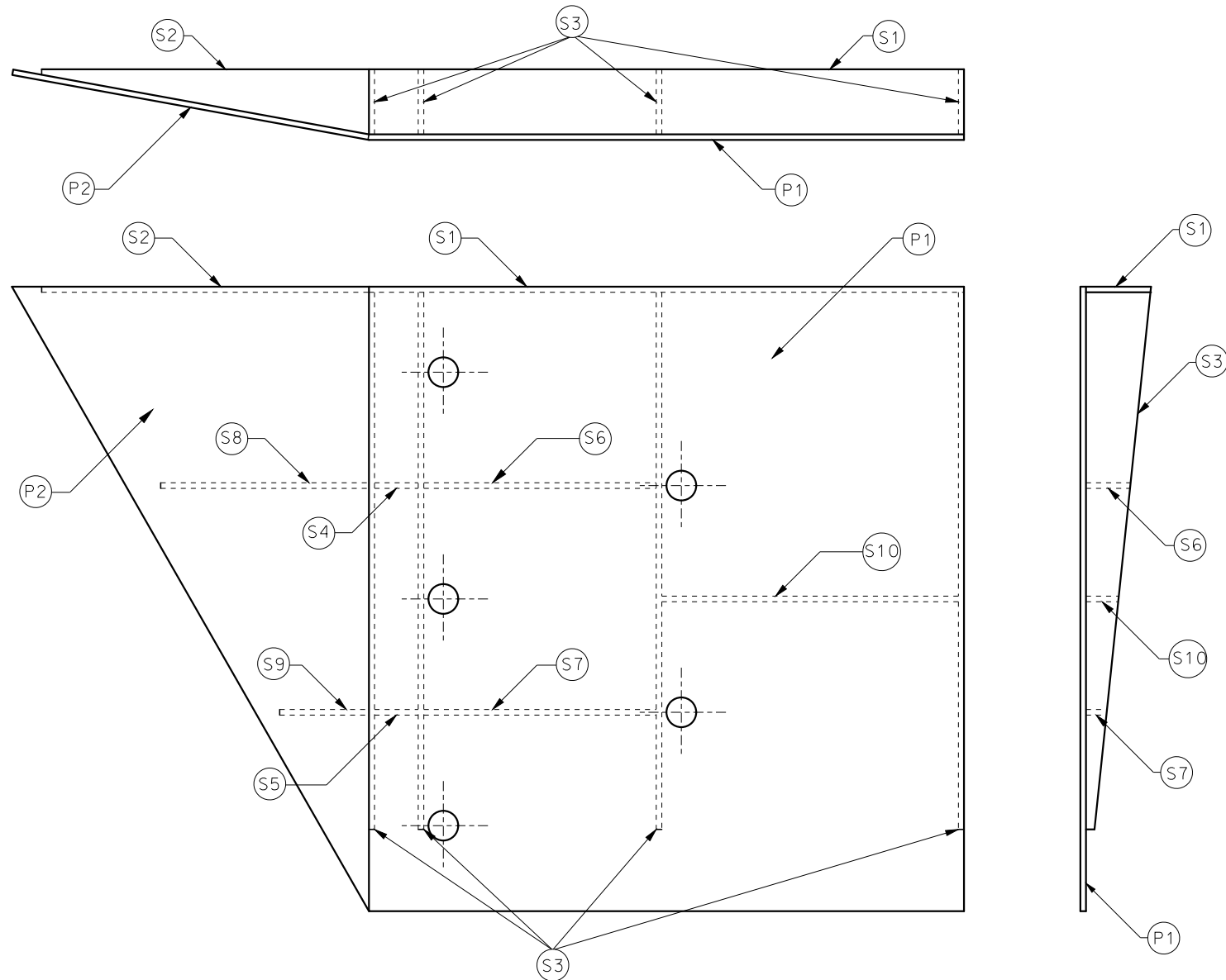
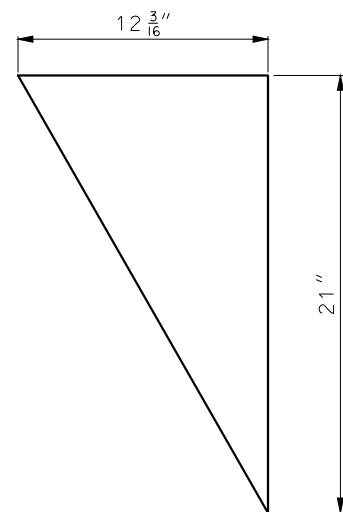
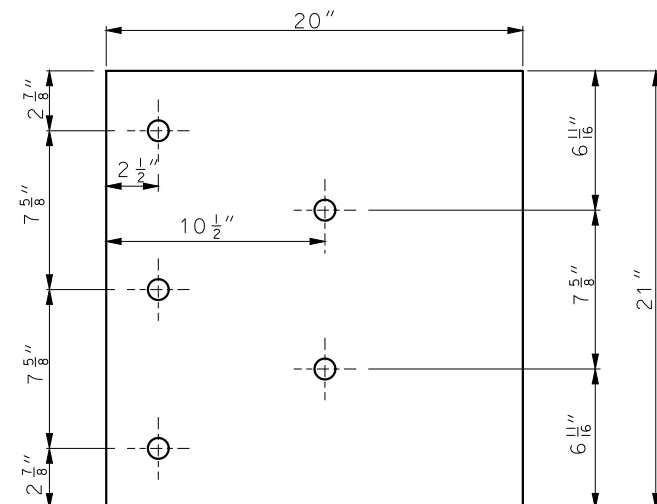


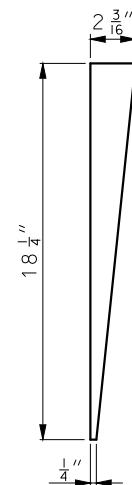
PLATE AND STIFFENER IDENTIFICATION



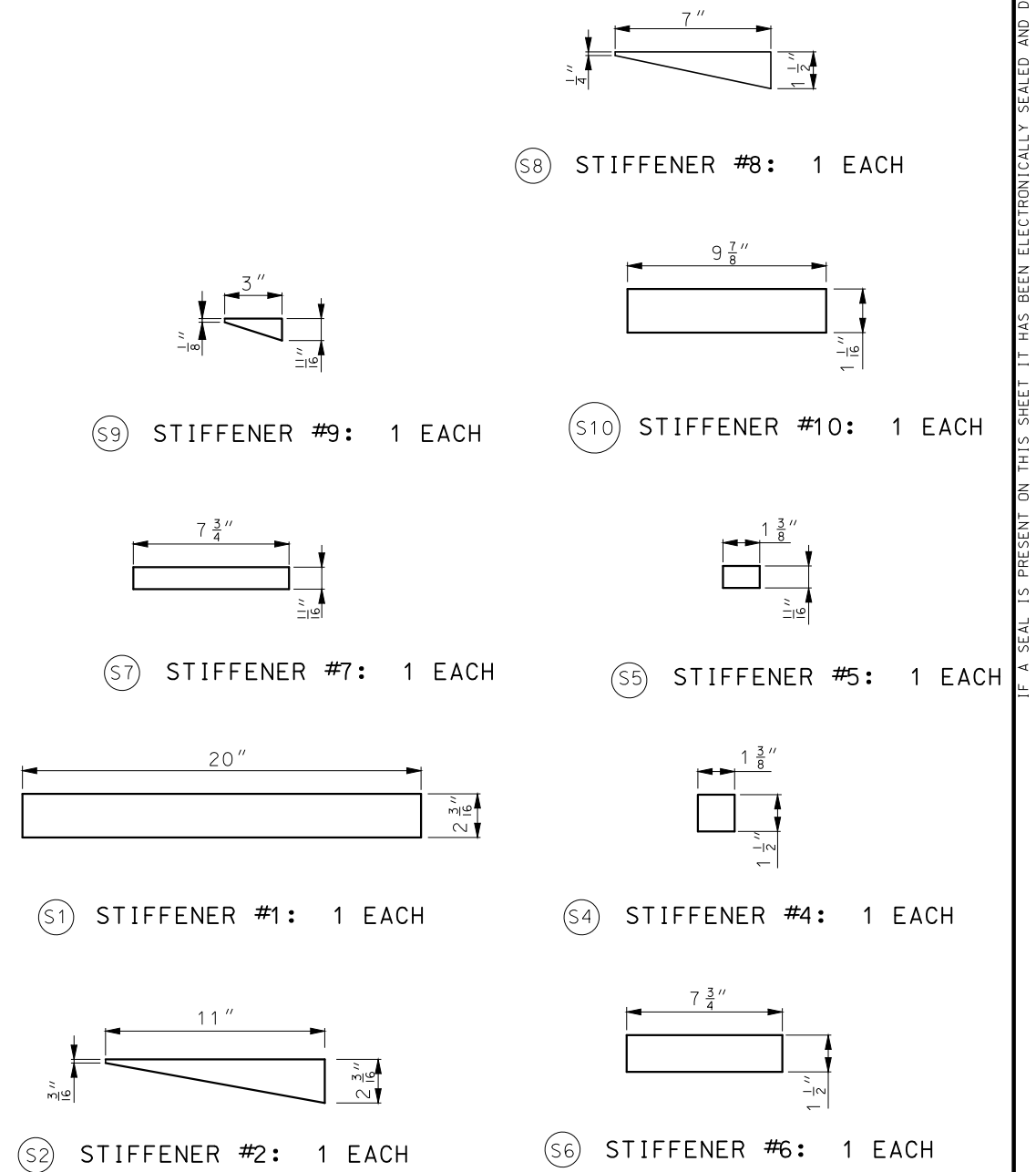
(P2) COVER PLATE #2


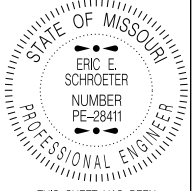


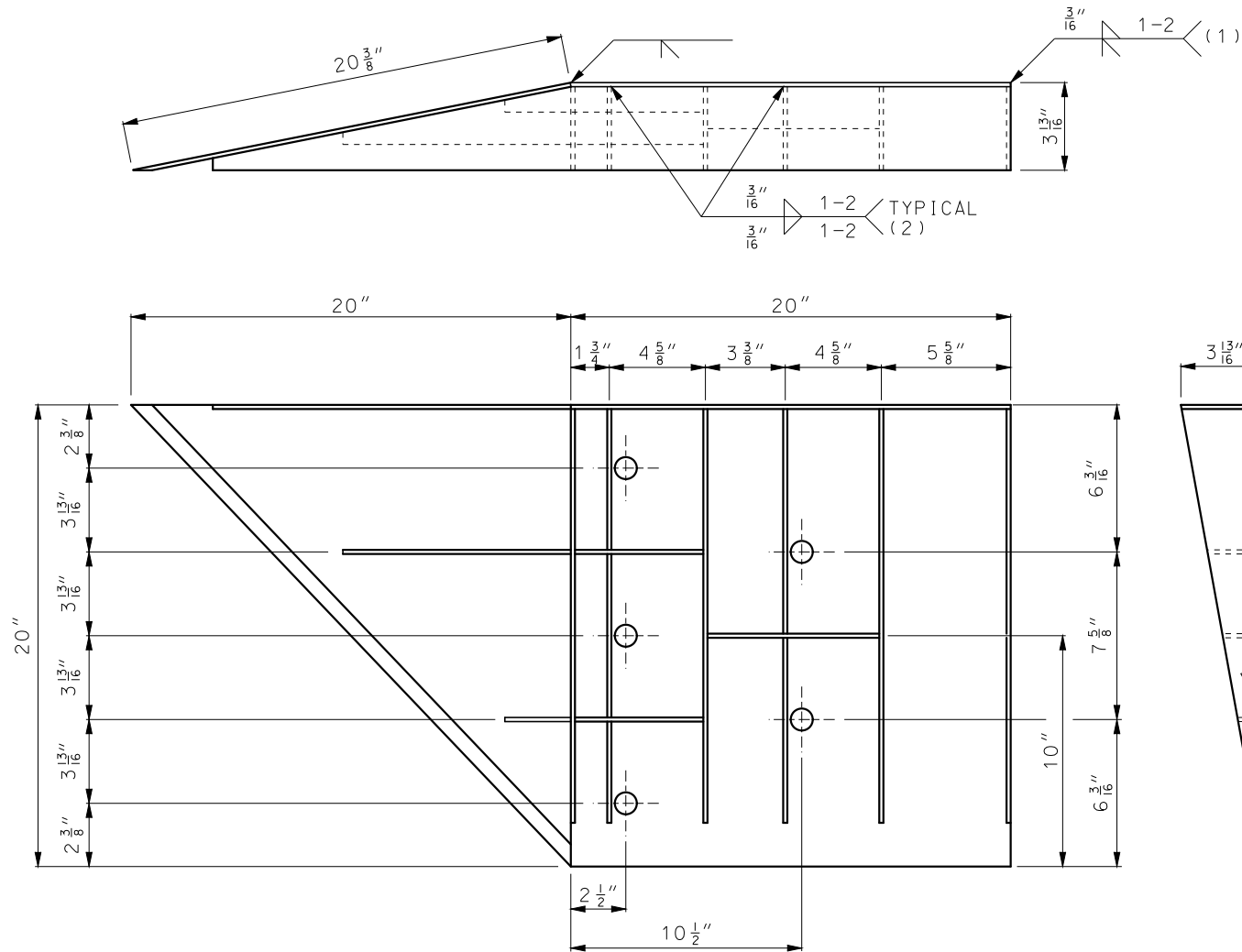
(P1) COVER PLATE #1



(S3) STIFFENER #3: 4 EACH



| | | |
|--|---|----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | BRIDGE ANCHOR SECTION SAFETY BARRIER CURB ON BRIDGE (CONNECTOR PLATE DETAIL) | |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 606.22U | SHEET NO. 5 OF 6 |



WELDING INSTRUCTION

- (1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:
 $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2".

| CONNECTOR PLATE DIMENSION (PER ASSEMBLY) | | | | |
|---|----------|-------|---|------------------|
| PLATE | QUANTITY | SHAPE | SIZE (A x B x C x D) | THICKNESS |
| P1 | 1 | B | 20" x 20" | $\frac{3}{16}$ " |
| P2 | 1 | B | 20" x 20" x 28 $\frac{9}{16}$ " | $\frac{3}{16}$ " |
| P3 | 1 | B | 39" x 3 $\frac{5}{8}$ " x 20" x 19 $\frac{5}{16}$ " | $\frac{3}{16}$ " |
| S1 | 4 | B | 18 $\frac{7}{16}$ " x 3 $\frac{5}{8}$ " x 18 $\frac{3}{4}$ " | $\frac{1}{4}$ " |
| S2 | 1 | B | 10 $\frac{1}{4}$ " x 2 $\frac{7}{16}$ " x 10 $\frac{3}{8}$ " x $\frac{1}{2}$ " | $\frac{1}{4}$ " |
| S3 | 1 | B | 3" x 1 $\frac{1}{16}$ " x 3 $\frac{1}{8}$ " x $\frac{1}{2}$ " | $\frac{1}{4}$ " |
| S4 | 1 | B | 6 $\frac{1}{8}$ " x 2 $\frac{7}{16}$ " | $\frac{1}{4}$ " |
| S5 | 1 | B | 6 $\frac{1}{8}$ " x 1 $\frac{1}{16}$ " | $\frac{1}{4}$ " |
| S6 | 1 | B | 7 $\frac{3}{4}$ " x 1 $\frac{3}{4}$ " | $\frac{1}{4}$ " |
| S7 | 1 | A | 2 $\frac{3}{16}$ " x 6" x 3 $\frac{5}{8}$ " x 5 $\frac{7}{8}$ " | $\frac{1}{4}$ " |
| S8 | 1 | A | 1 $\frac{5}{32}$ " x 7 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " x 7 $\frac{3}{8}$ " | $\frac{1}{4}$ " |
| S9 | 1 | C | 6 $\frac{1}{16}$ " x 6 $\frac{3}{16}$ " x 1 $\frac{3}{32}$ " | $\frac{1}{4}$ " |
| S10 | 1 | A | 1 $\frac{7}{8}$ " x 9 $\frac{7}{8}$ " x 3 $\frac{5}{8}$ " x 9 $\frac{11}{16}$ " | $\frac{1}{4}$ " |
| S11 | 1 | C | 8 $\frac{1}{2}$ " x 8 $\frac{3}{4}$ " x 1 $\frac{13}{16}$ " | $\frac{1}{4}$ " |

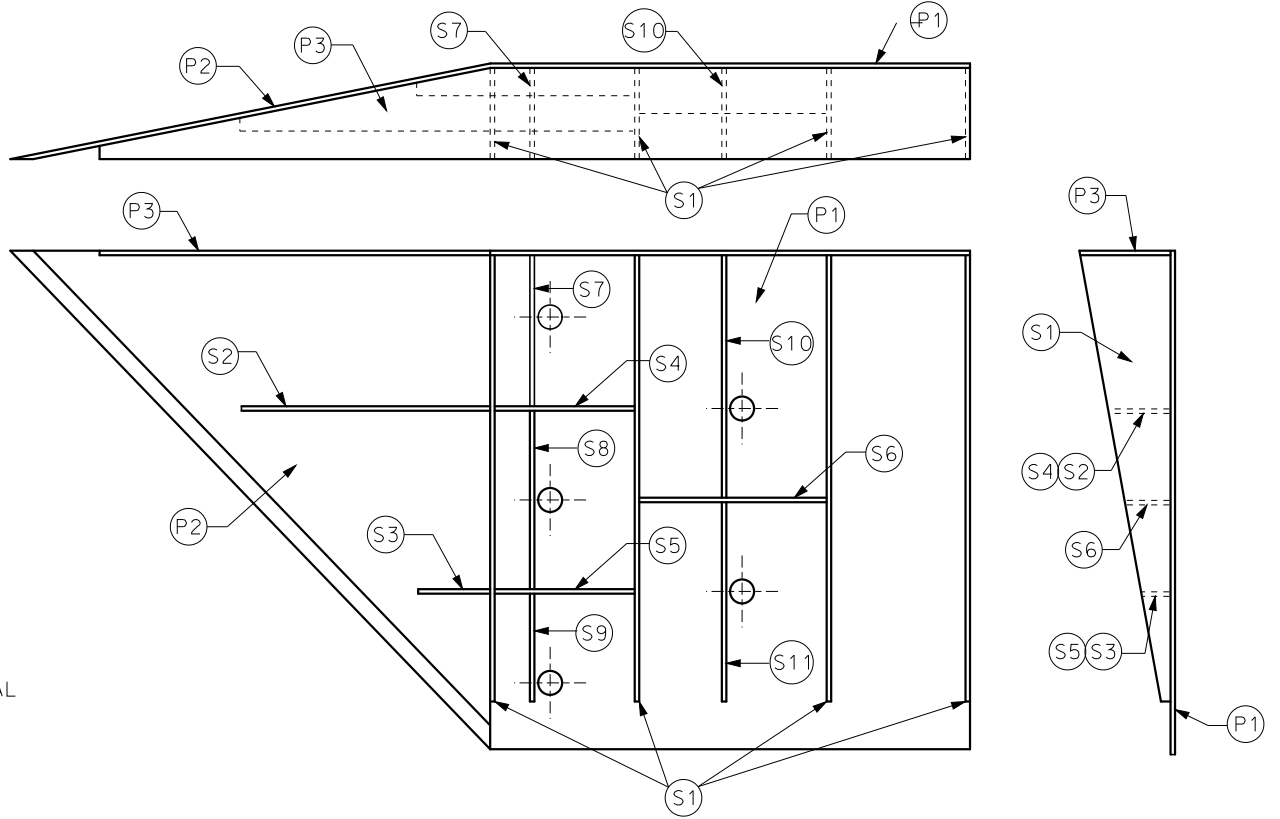


PLATE AND STIFFENER IDENTIFICATION

GENERAL NOTES:


COVER PLATE PANELS ARE $\frac{3}{16}$ " THICK.

ALL STIFFENERS ARE $\frac{1}{4}$ " THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

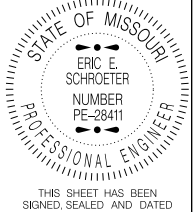
FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".



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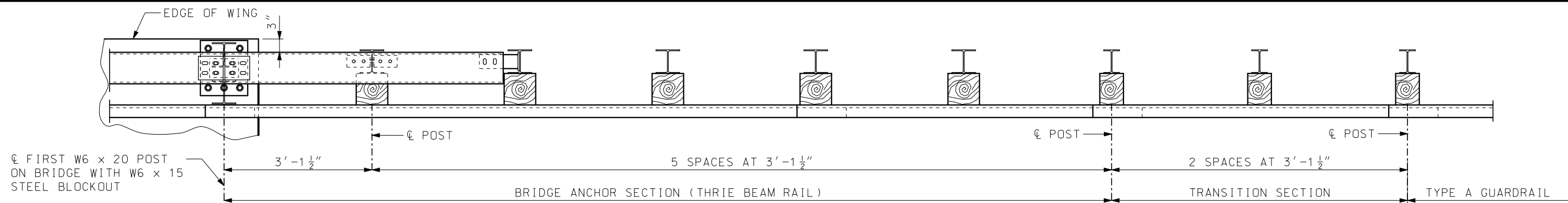


BRIDGE ANCHOR SECTION
SAFETY BARRIER CURB ON BRIDGE
(CONNECTOR PLATE DETAIL)
SINGLE SLOPE BARRIERS

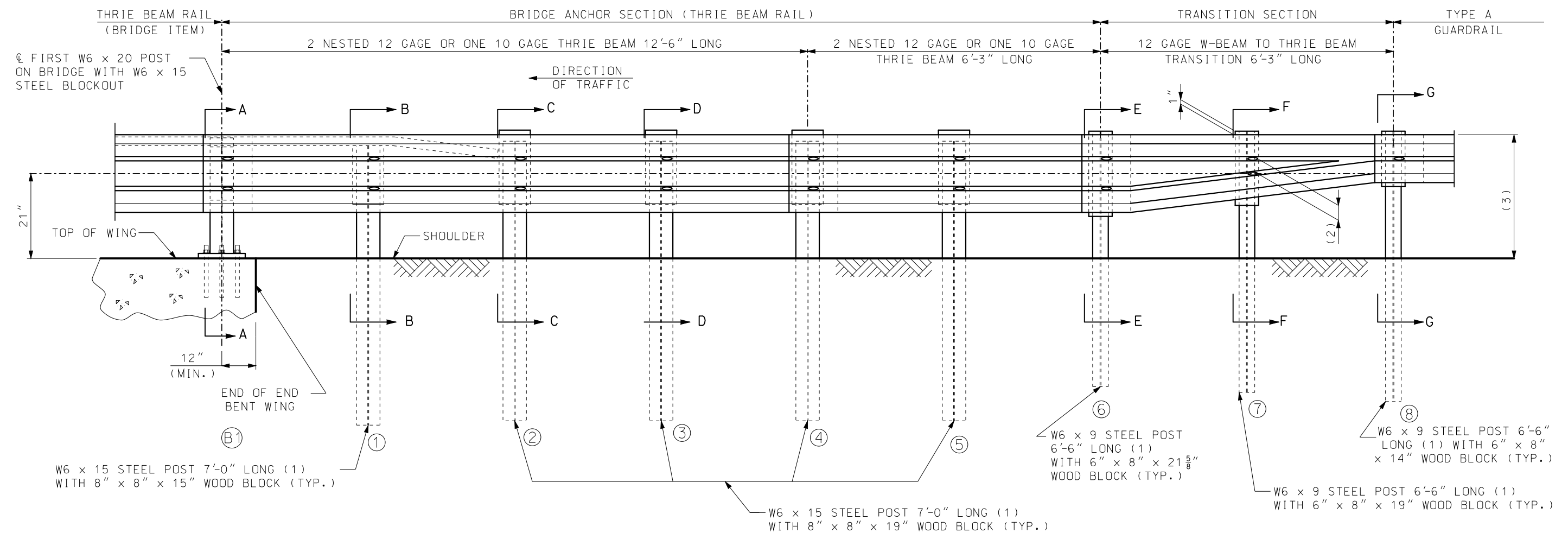
DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

606.22U

SHEET NO.
6 OF 6



PLAN




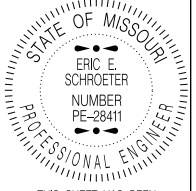
PART SECTION THROUGH SLAB AT END OF WING

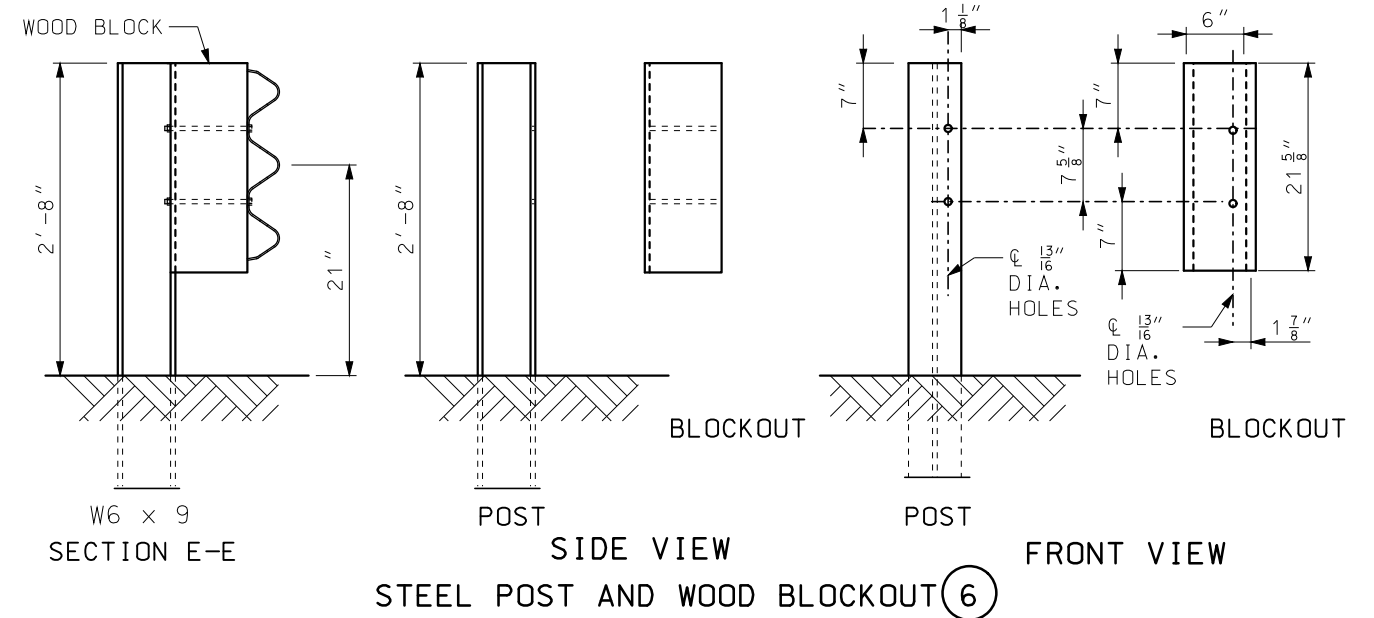
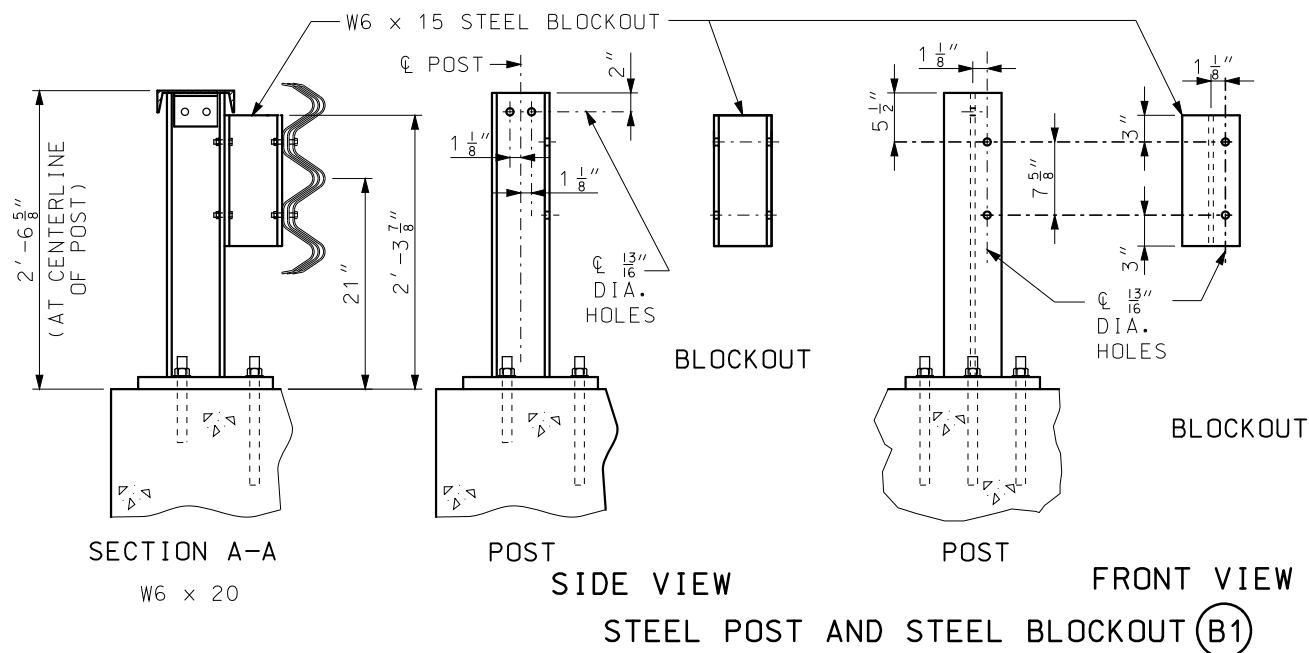
NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

- (1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.
- (2) VERIFY BY RAIL TRANSITION PRODUCER.
- (3) TRANSITION FROM 31" TO 29" HEIGHT OVER NEXT TWO UPSTREAM 12'-6" W-BEAM RAILS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE) |
| DATE EFFECTIVE: 7/01/016 DATE PREPARED: 5/13/2016 | 606.23J |
| SHEET NO. 1 OF 5 | |



GENERAL NOTES:

DESIGN BASED UPON NCHRP REPORT 350 TEST LEVEL 3 (TL-3).

THE THRIE BEAM RAIL FOR THE BRIDGE ANCHOR SECTION SHALL BE 12 GAGE OR 10 GAGE AT THE CONTRACTOR'S OPTION, AND THE TRANSITION SECTION SHALL BE 12 GAGE.

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

WASHERS SHALL BE USED AT ALL POST BOLTS.

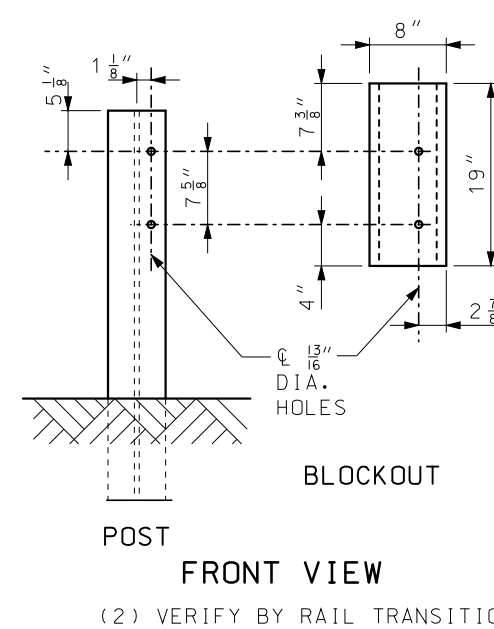
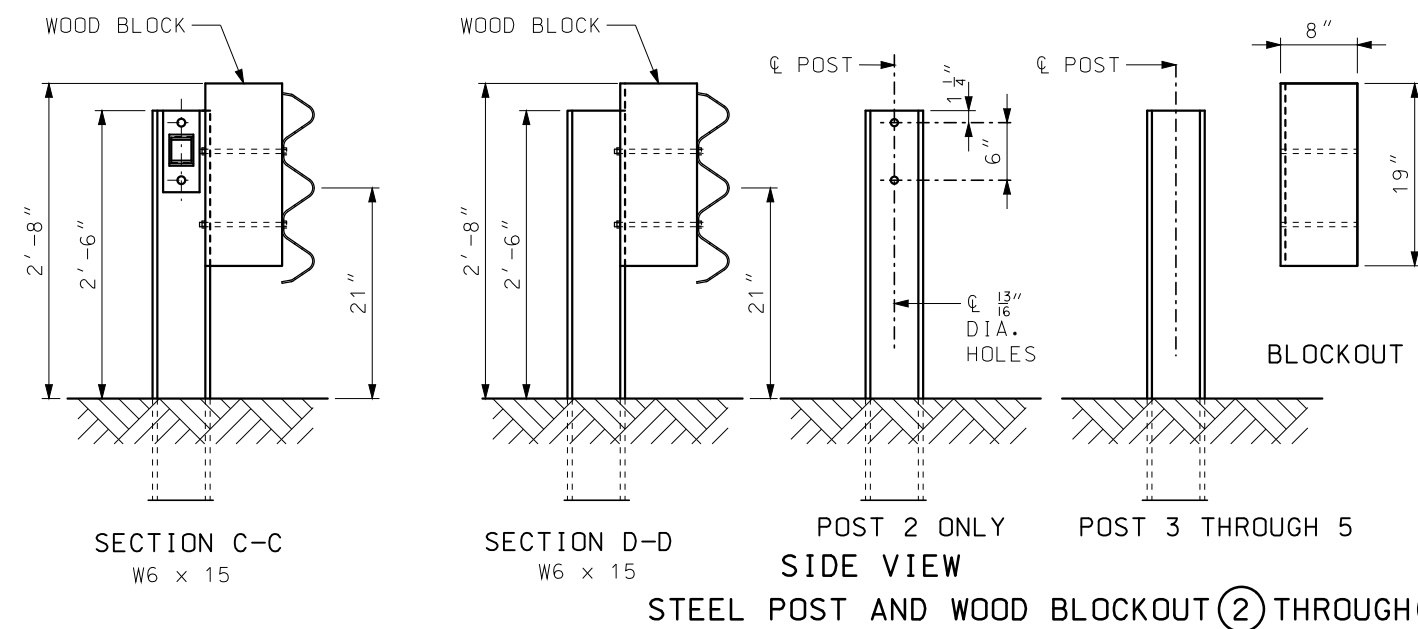
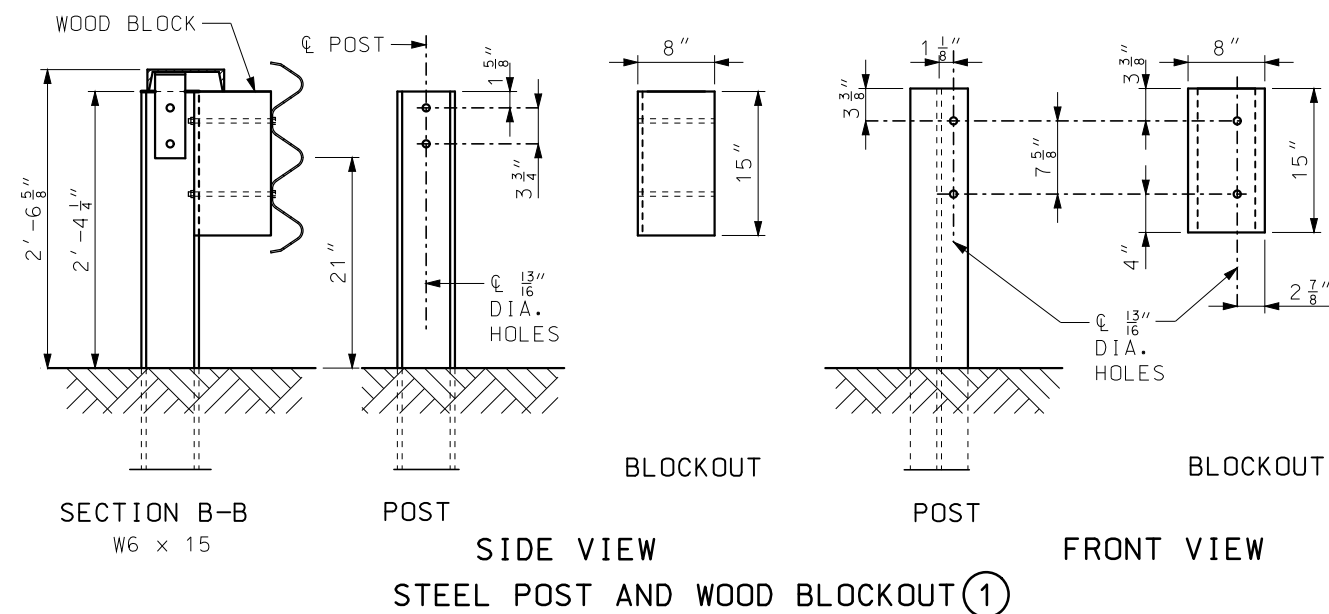
USE 5/8" BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS = 3/8" MIN.) AT ALL SLOTS.


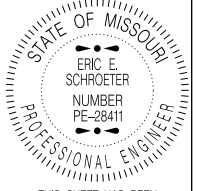
ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

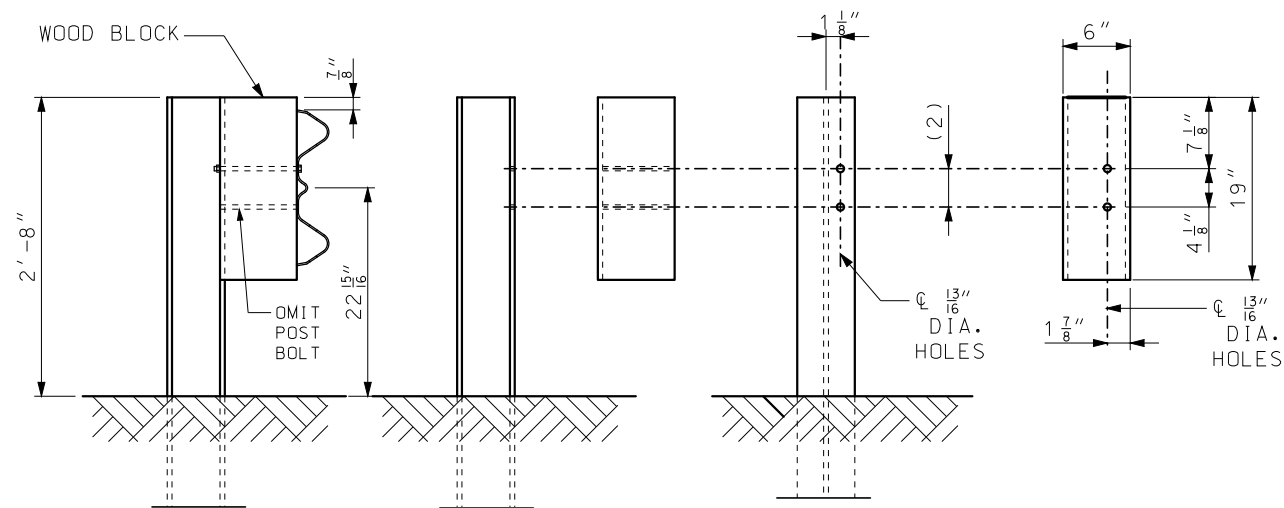
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.

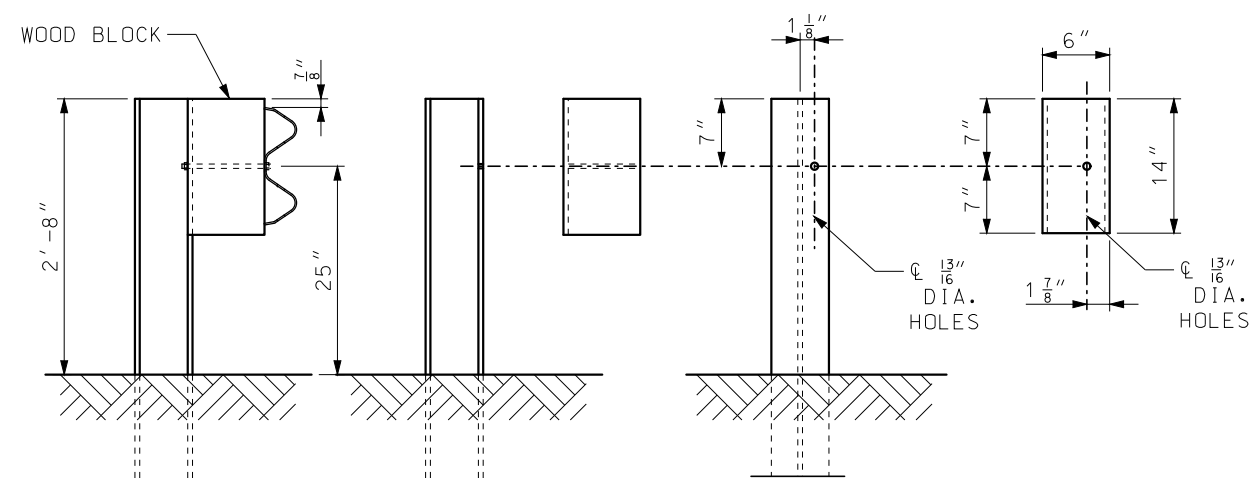


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|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE) |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | SHEET NO. 606.23J 2 OF 5 |

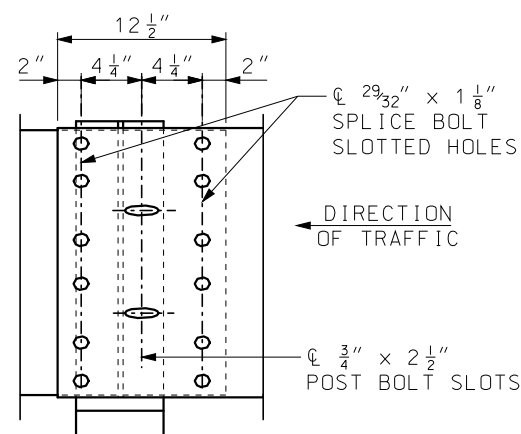
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



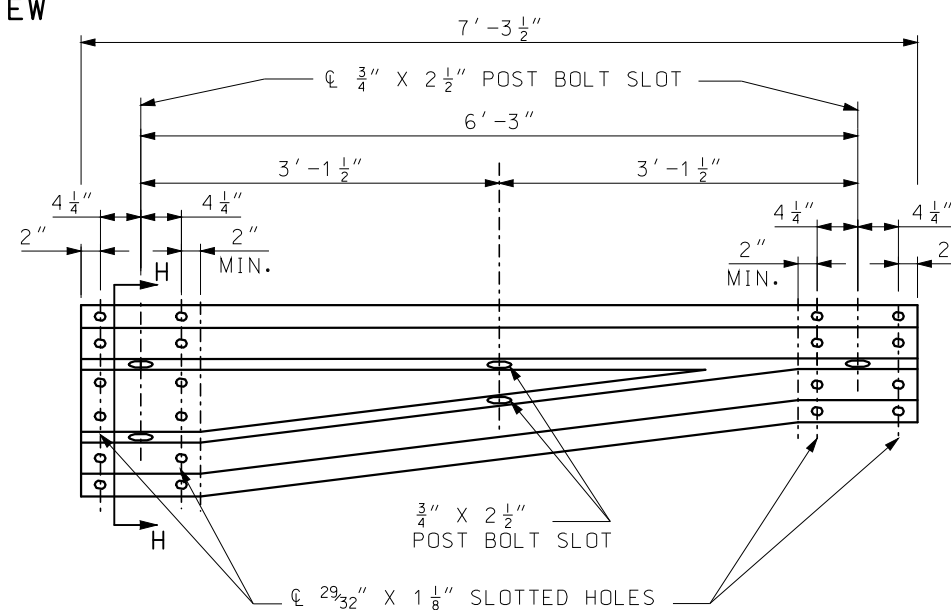
SECTION F-F
STEEL POST AND WOOD BLOCKOUT (7)



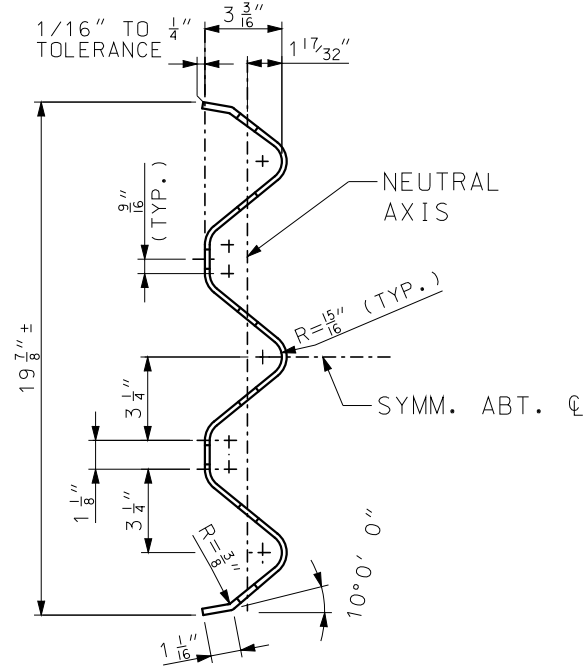
SECTION G-G
STEEL POST AND WOOD BLOCKOUT (8)



THRIE BEAM RAIL SPLICE AT POST

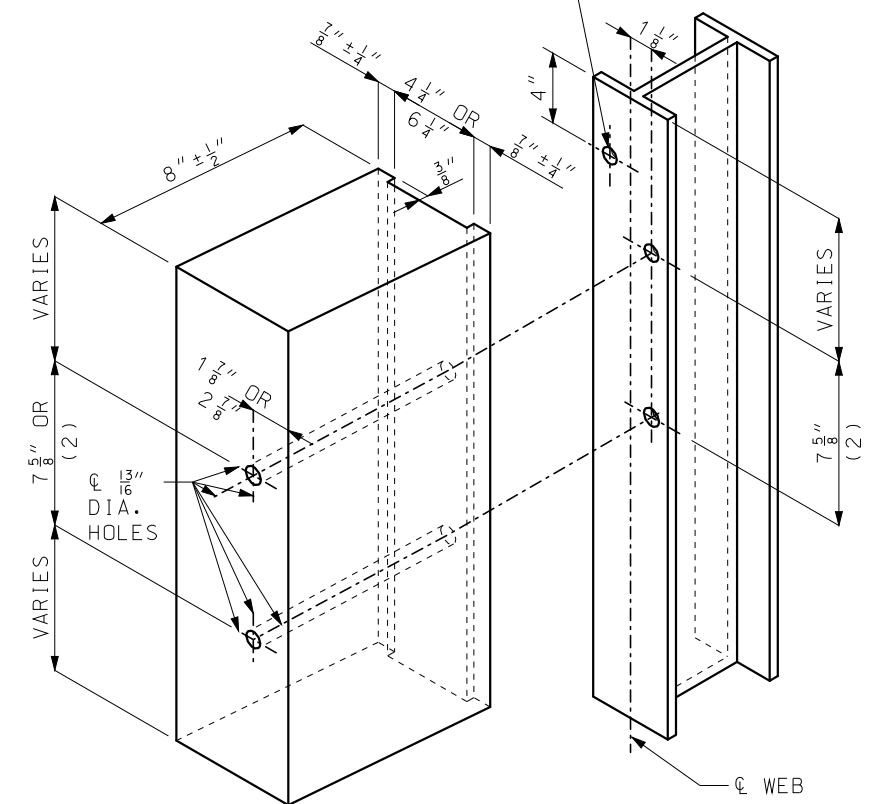


ASYMMETRICAL TRANSITION SECTION




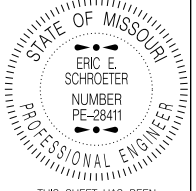
SECTION H-H
THROUGH THRIE BEAM RAIL

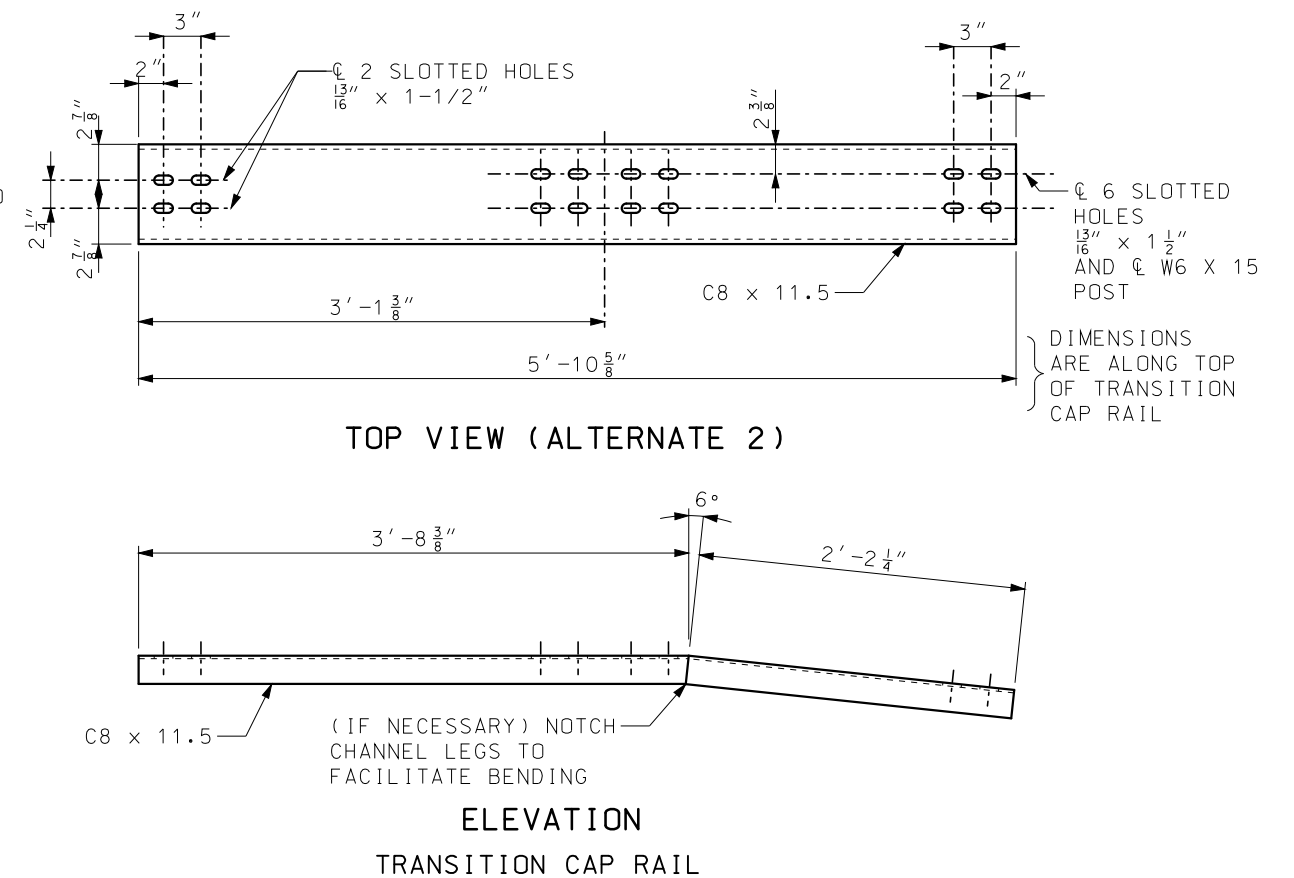
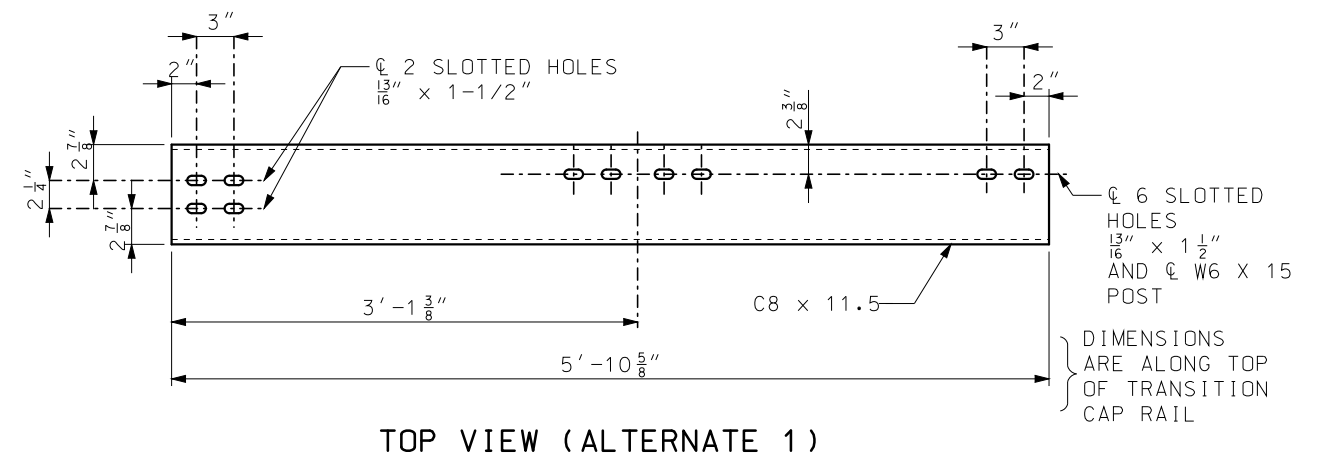
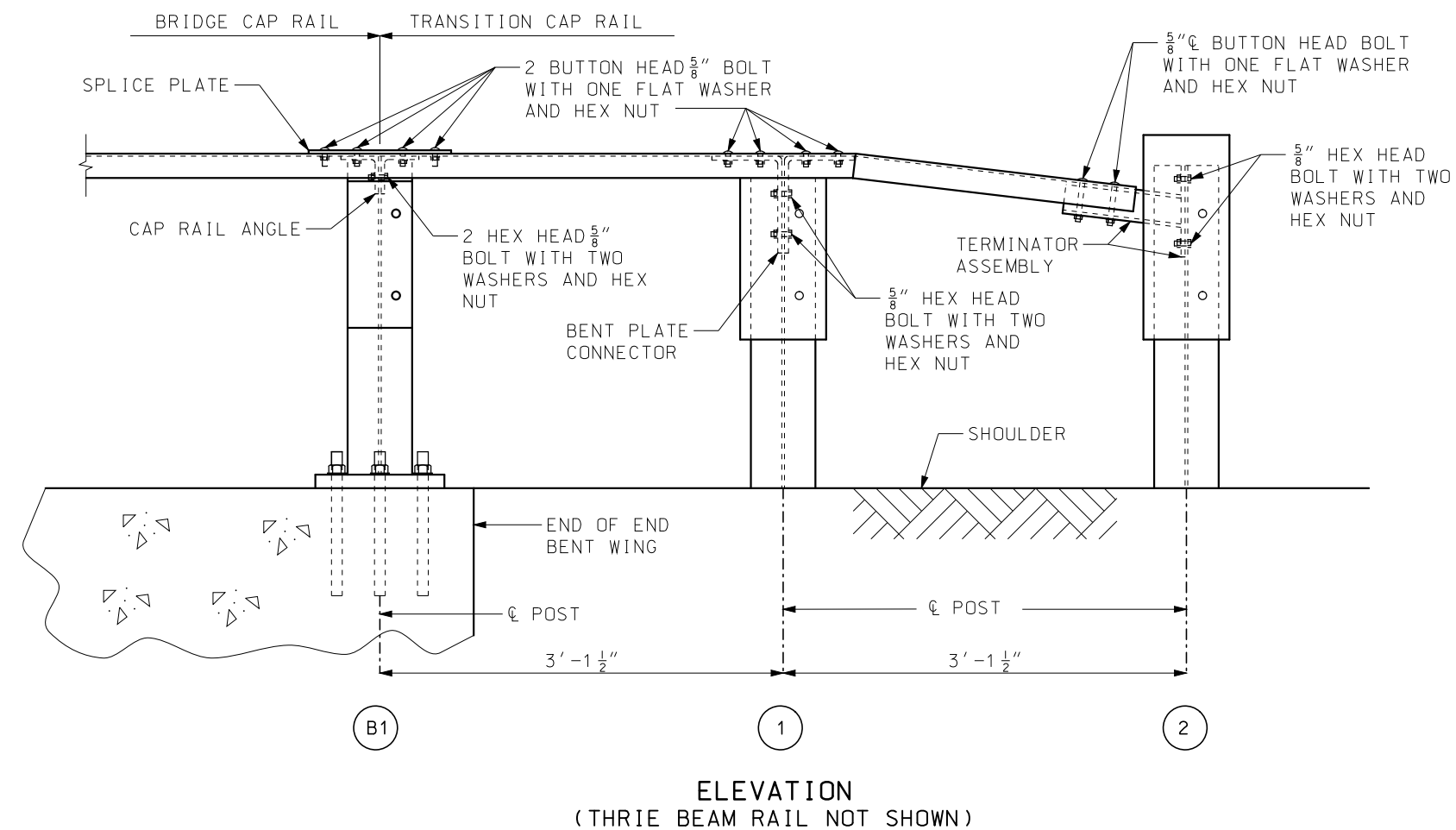
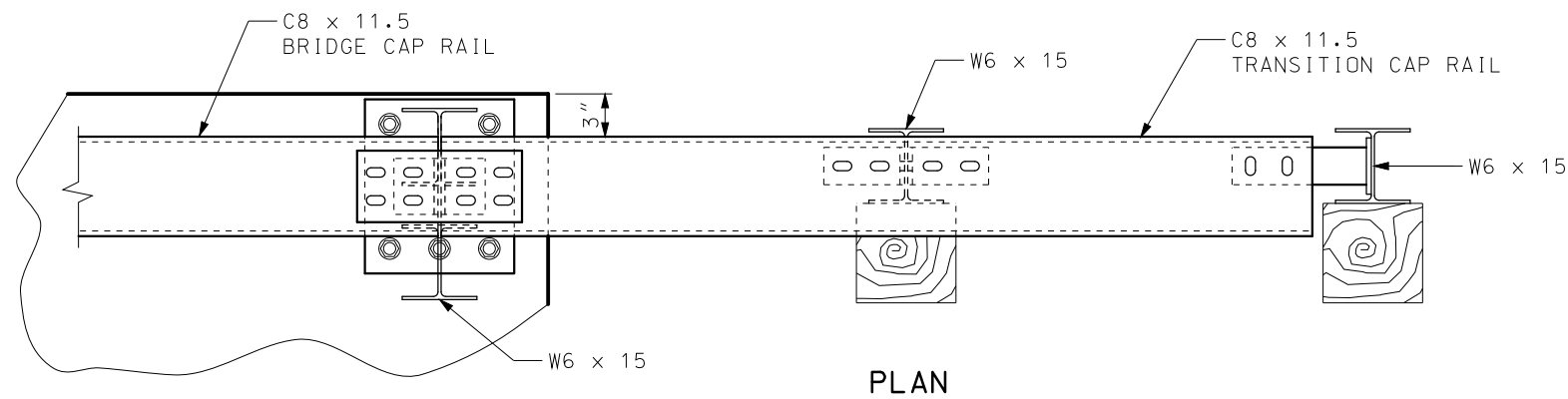
OPTIONAL 13/16" DIA. HOLE FOR HANDLING DURING GALVANIZING. (ONE PERMITTED)



POST (7) - (2) VERIFY BY RAIL TRANSITION PRODUCER (SEE FRONT SHEET)
POST (8) - ONLY 1 HOLE REQUIRED
ALL HOLES 13/16" DIAMETER EXCEPT AS NOTED

HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD BLOCKS (6" AND 8")

| | | |
|--|---|----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE) | |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 606.23J | SHEET NO. 3 OF 5 |

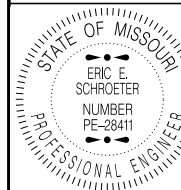


GENERAL NOTES:



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

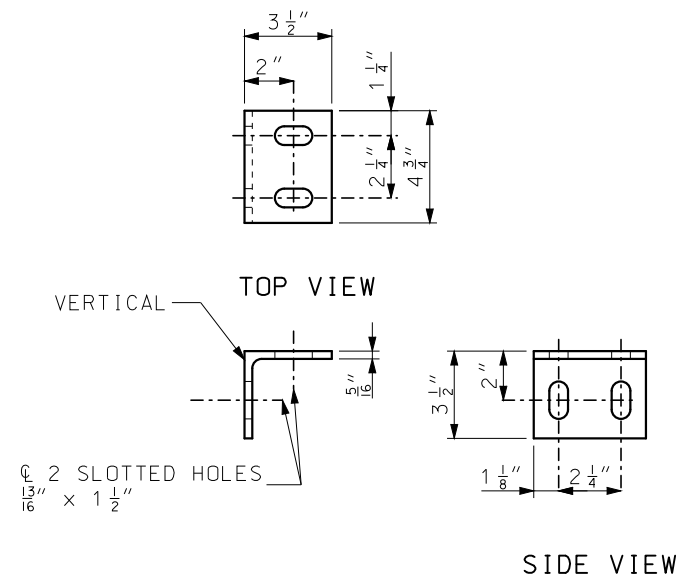
BRIDGE ANCHOR SECTION
(THRIE BEAM RAIL ON BRIDGE)

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

606.23J

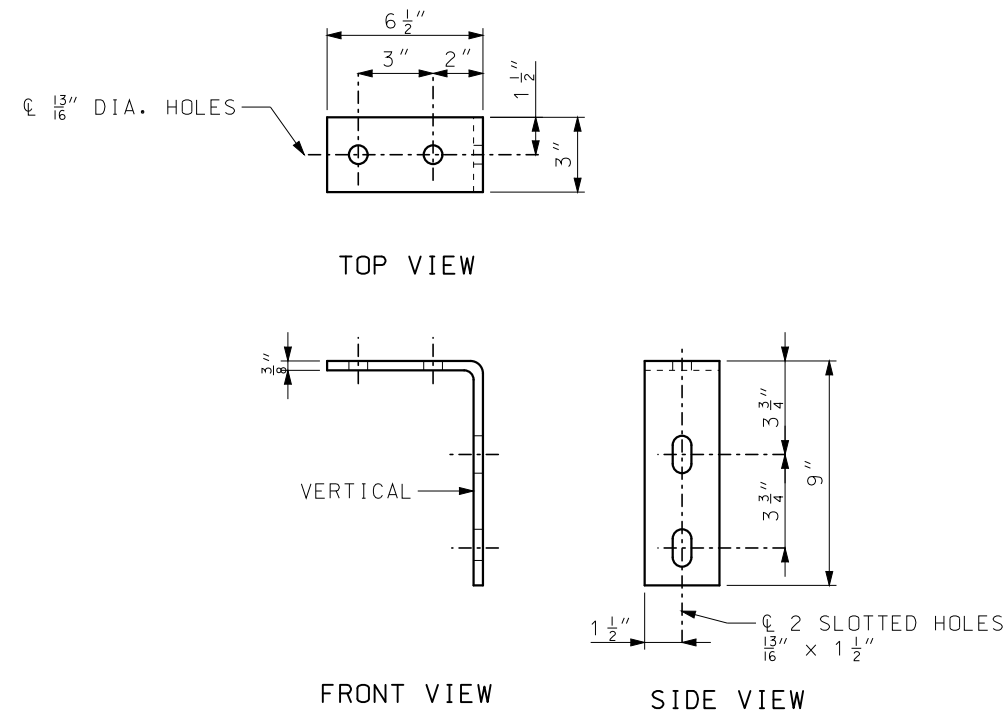
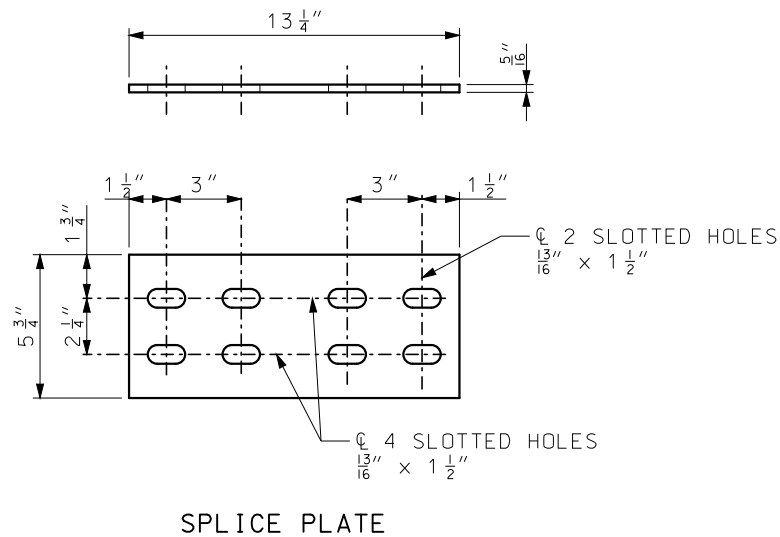
SHEET NO.
4 OF 5

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

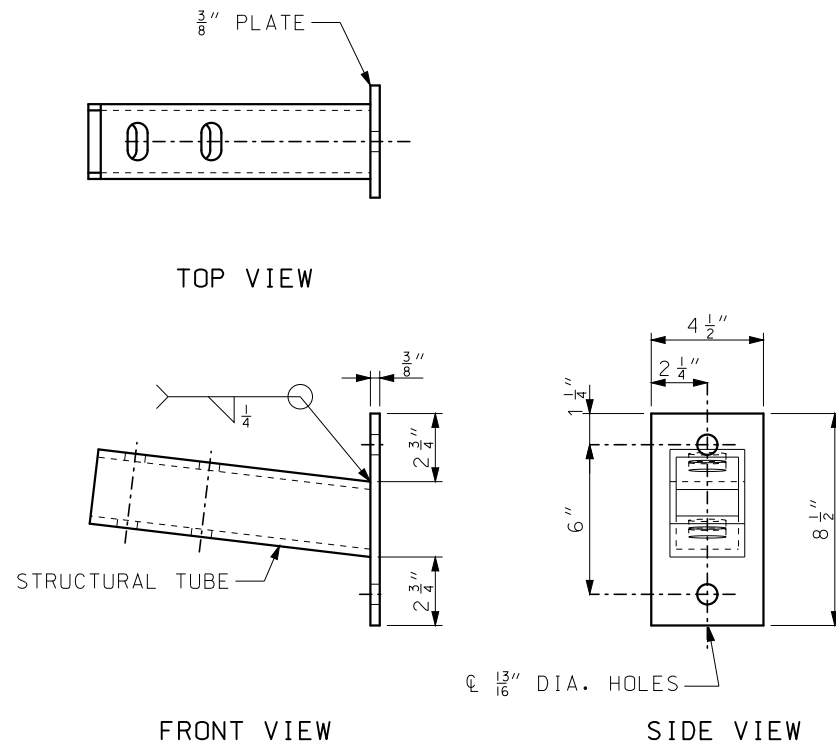


CAP RAIL ANGLE

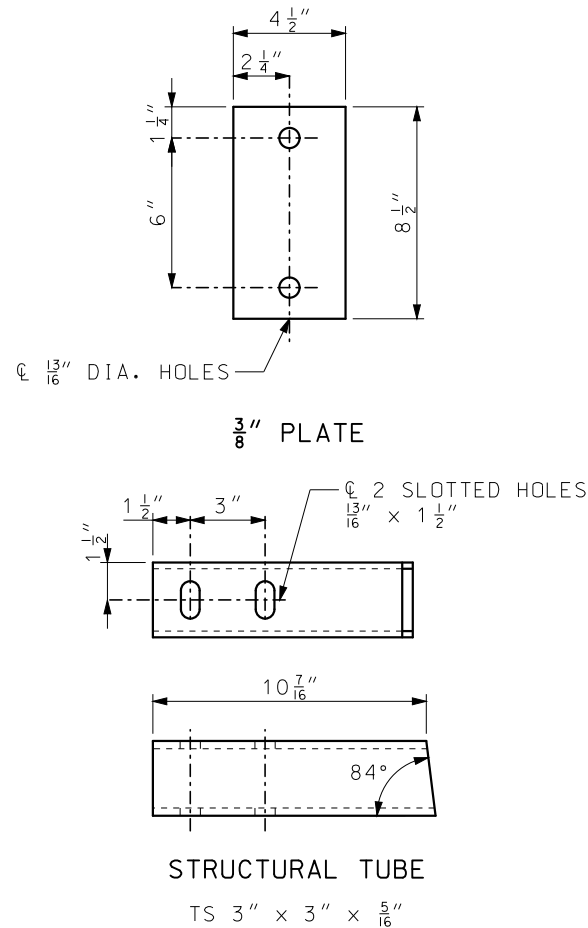
3 1/2" x 3 1/2" x 5/16"





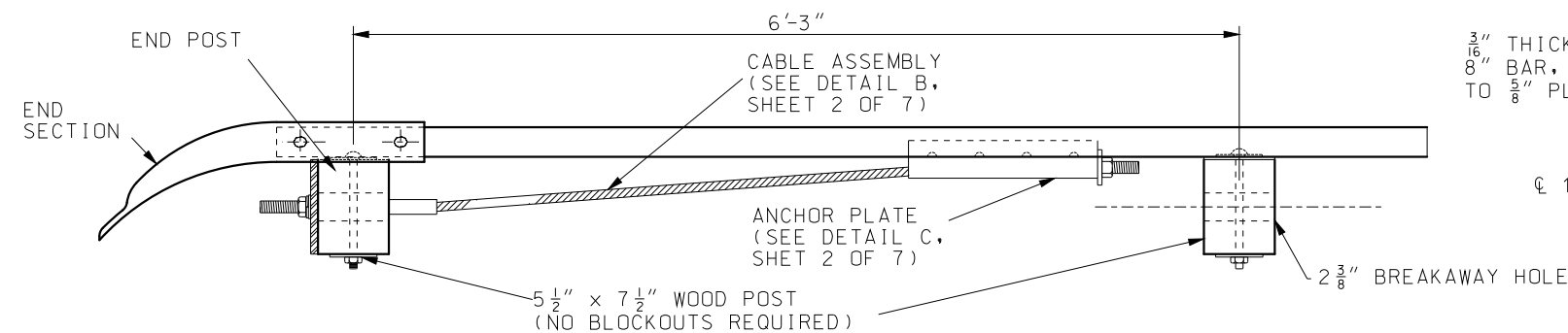
BENT PLATE CONNECTOR



TERMINATOR ASSEMBLY

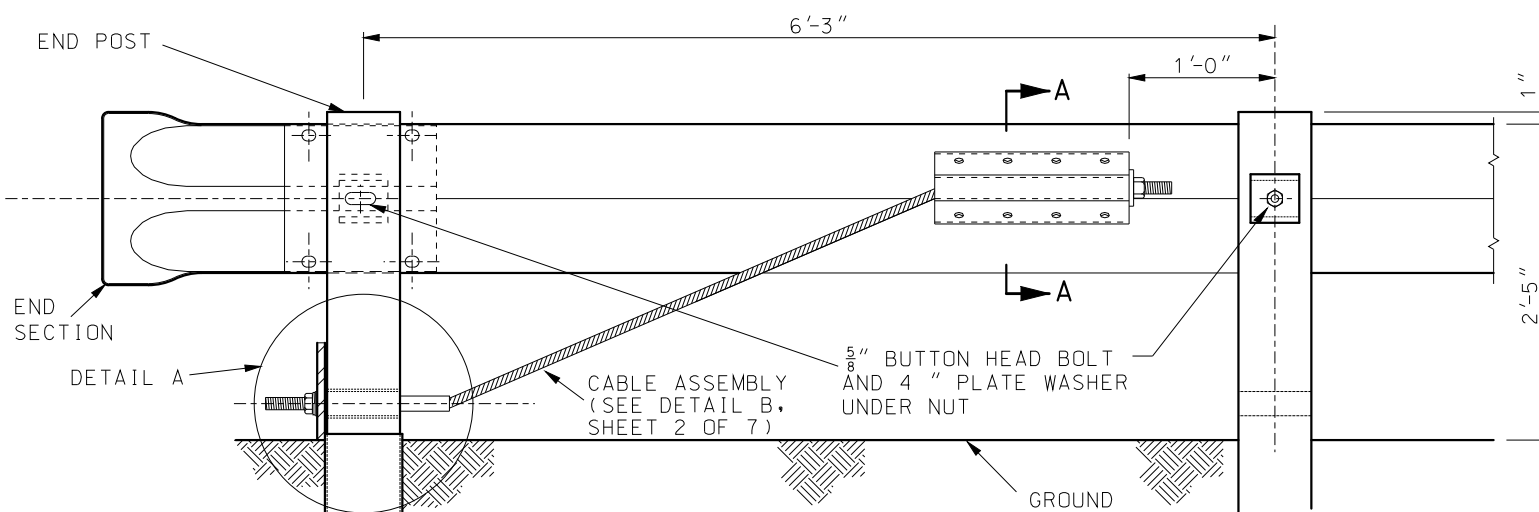


| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE) |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 606.23J |
| SHEET NO. 5 OF 5 | |



NOTE: FOR DETAILS OF END SECTION,
SEE STD PLANS 606.00.

PLAN



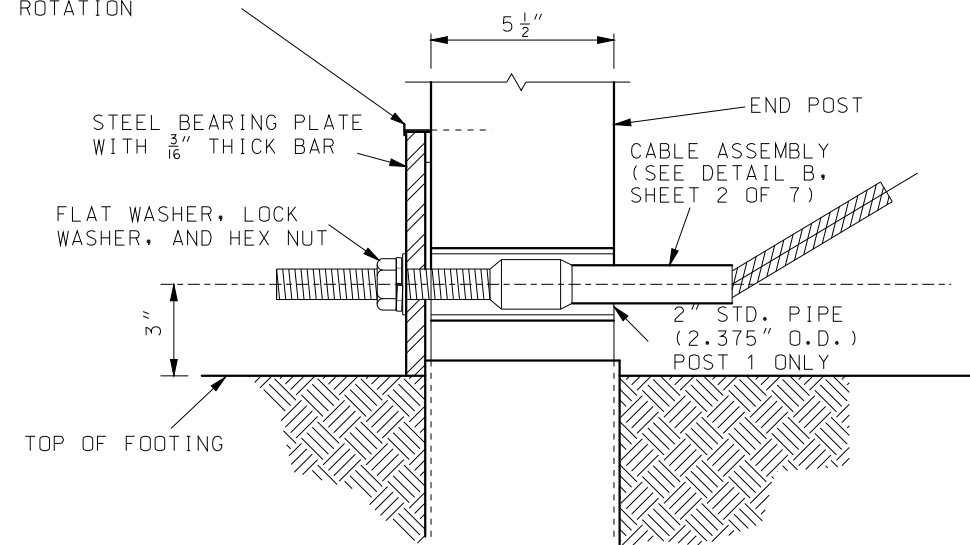
POST 1

ELEVATION
(BACK SIDE)

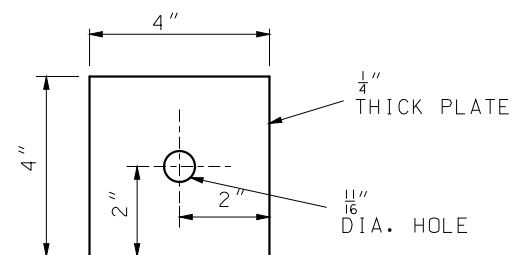
POST 2

END ANCHOR DETAILS

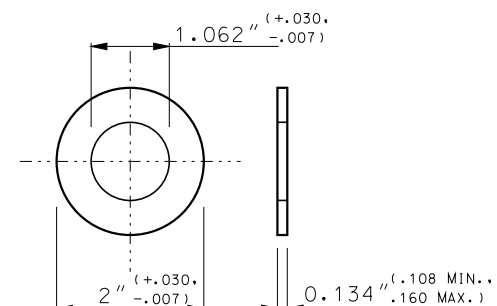
TWO 8D GALV. NAILS
TO PREVENT PLATE
ROTATION



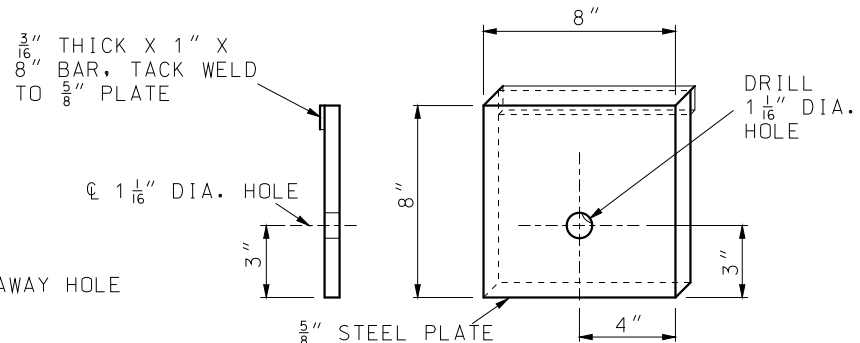
DETAIL A
(END POST DETAIL)



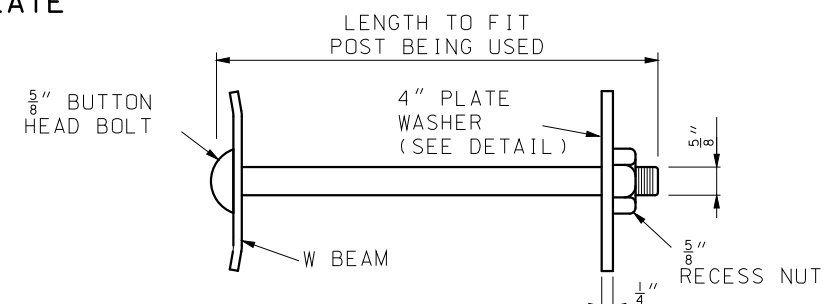
4" PLATE WASHER



TYPE A WASHER



DETAIL OF
STEEL BEARING PLATE



POST BOLT ASSEMBLY

GENERAL NOTES:

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON
DOWN STREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR
IS REQUIRED.

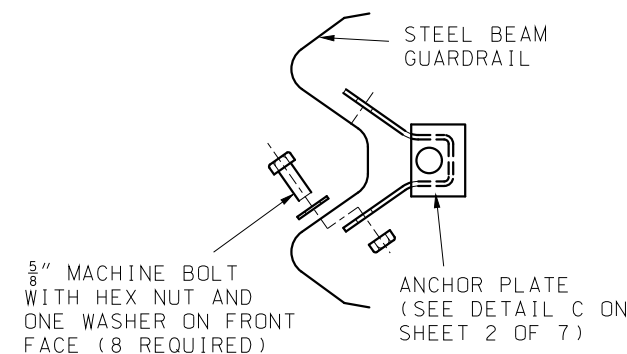
THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM
FOR GUARDRAIL. GUARDRAIL AND POSTS ARE PAID FOR
SEPARATELY.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL BE SUBJECT TO
APPROVAL BY THE ENGINEER AND SHALL HAVE A MINIMUM
BREAKING STRENGTH OF 20 TONS.

ALL FITTINGS AND HARDWARE REQUIRED SHALL BE
GALVANIZED AFTER FABRICATION, SEE SECTION 1040
STANDARD SPECIFICATION.

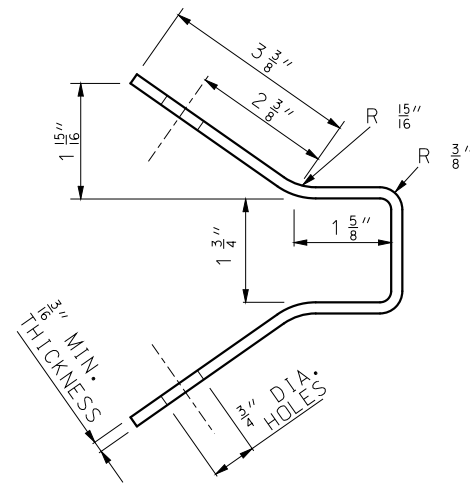
WOOD POSTS 1 AND 2 SHALL BE 5 1/2" X 7 1/2".

SEE SHEET 3 FOR WOOD POST DETAILS.

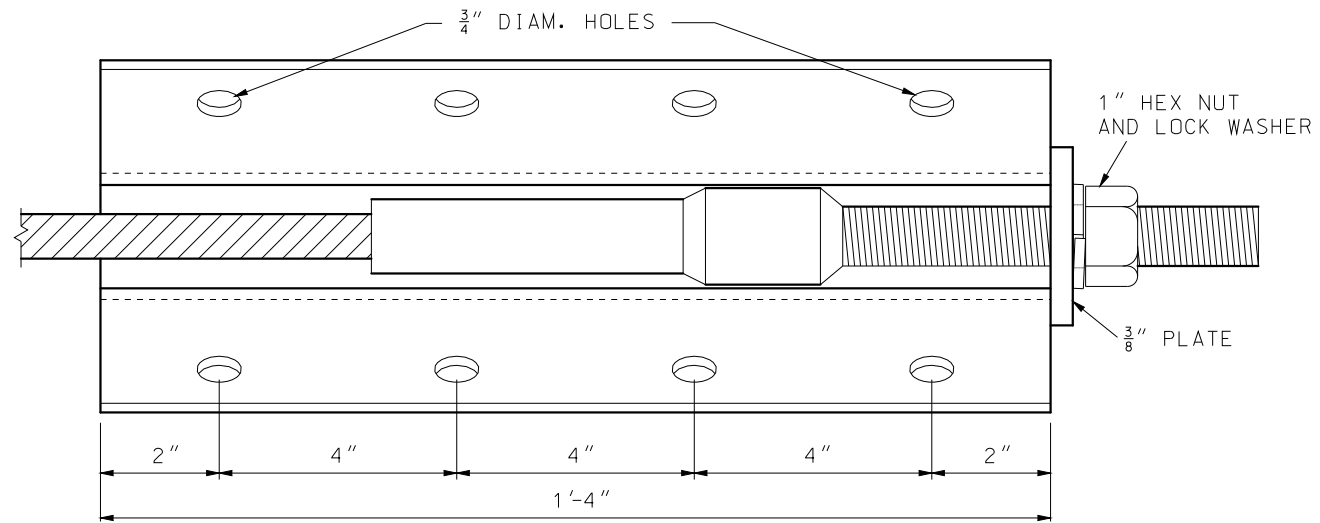


SECTION A-A

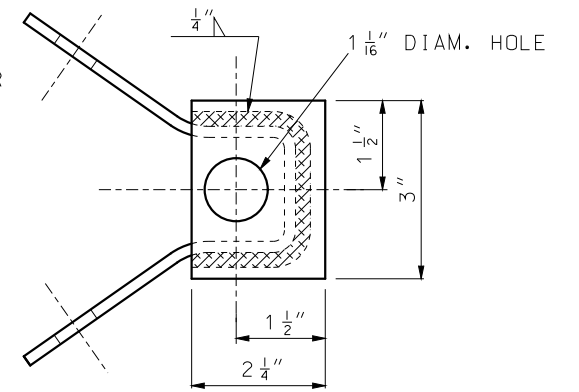
| | |
|---|--|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI</p> <p>ERIC E. SCHROETER</p> <p>NUMBER PE-28411</p> <p>PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>GUARDRAIL</p> <p>TERMINAL ANCHOR ENDS</p> |
| <p>DATE EFFECTIVE: 04/01/2017</p> <p>DATE PREPARED: 1/30/2017</p> | <p>606.30K</p> |
| <p>SHEET NO. 1 OF 7</p> | |



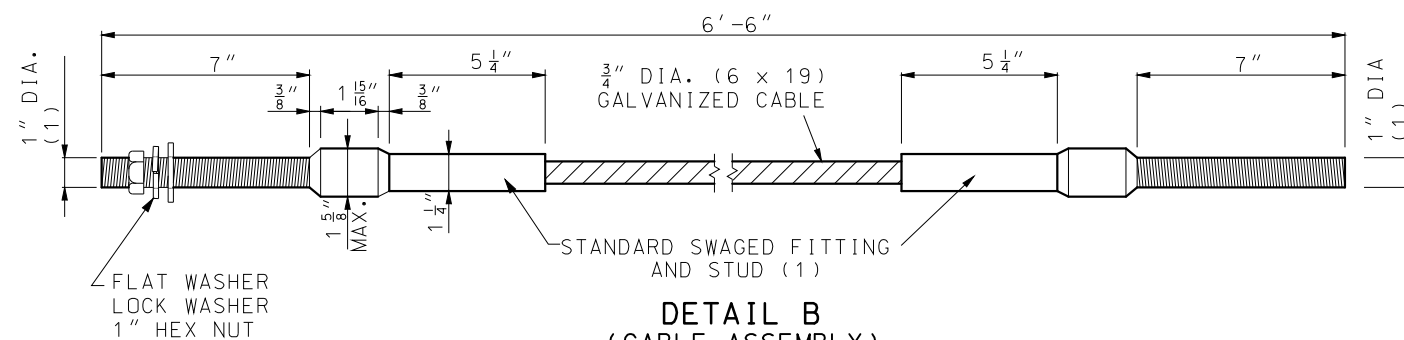
FABRICATION DETAIL



DETAIL C
ASSEMBLED VIEW
(ANCHOR PLATE)

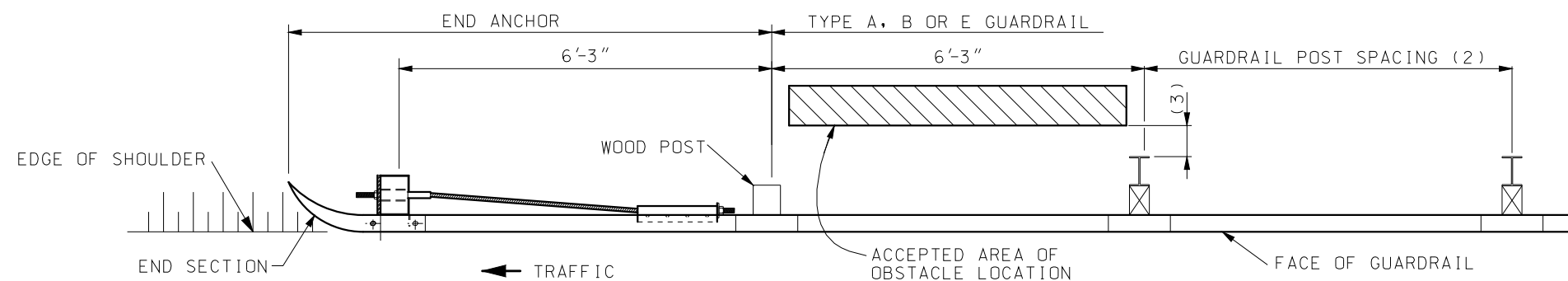


END VIEW

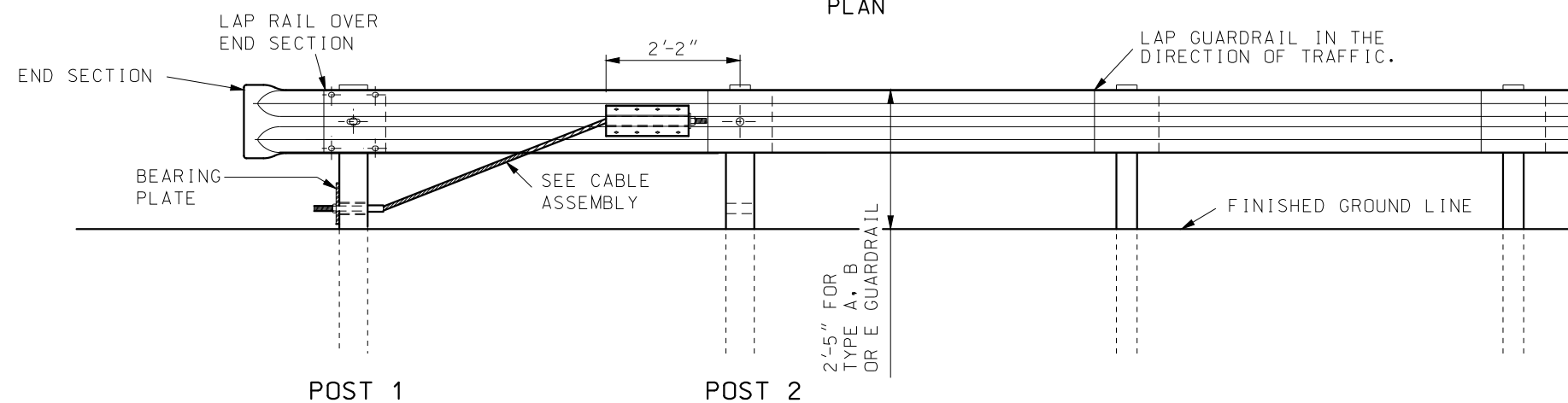


DETAIL B
(CABLE ASSEMBLY)

- (1) STUD, THREADED ENTIRE LENGTH.
- (2) 6'-3" SPACING FOR TYPE A OR B GUARDRAIL; 3'-1 1/2" SPACING FOR TYPE E GUARDRAIL.
- (3) 27" MINIMUM BUT LESS THAN 4' FOR TYPE E GUARDRAIL; 4' MINIMUM FOR TYPE A GUARDRAIL.

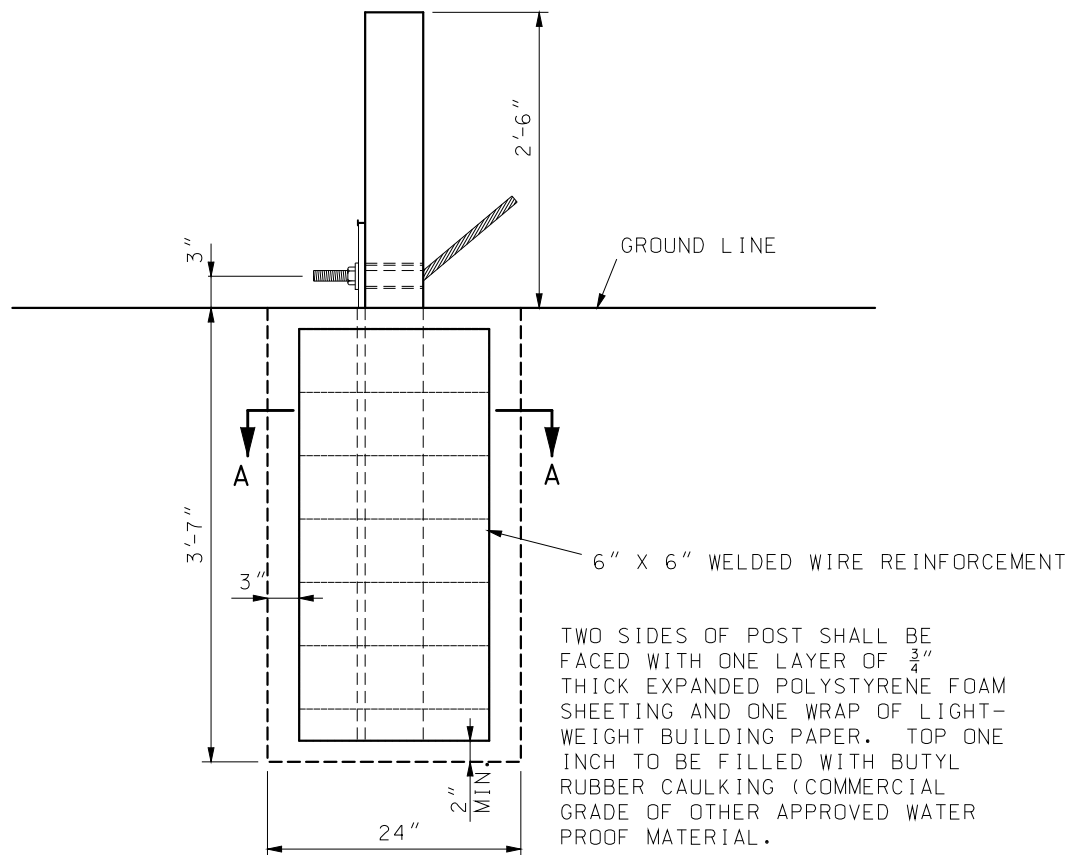


PLAN



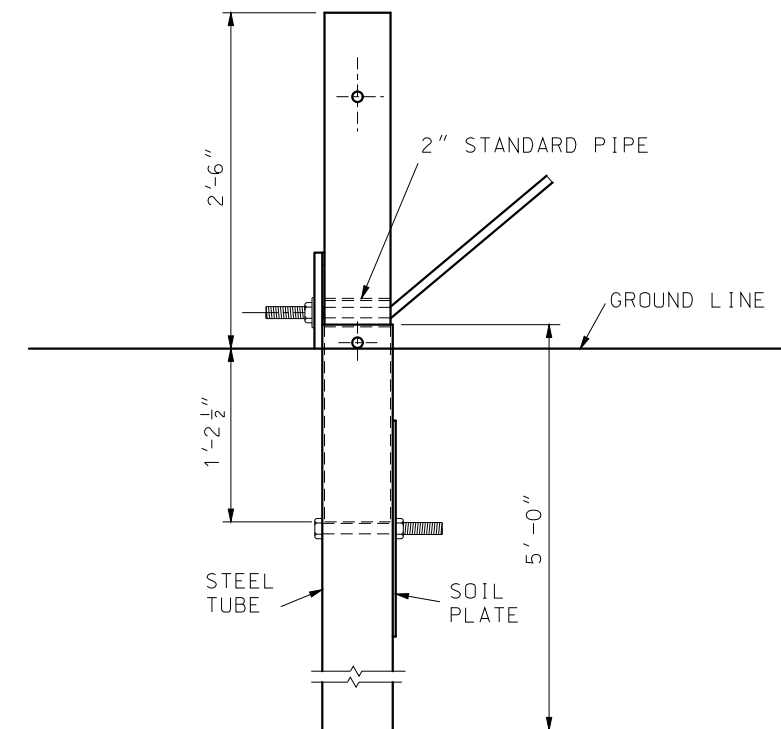
ELEVATION
END ANCHOR

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | GUARDRAIL TERMINAL ANCHOR ENDS |
| DATE EFFECTIVE: 04/01/2017 DATE PREPARED: 1/30/2017 | SHEET NO. 2 OF 7 |



POST 1

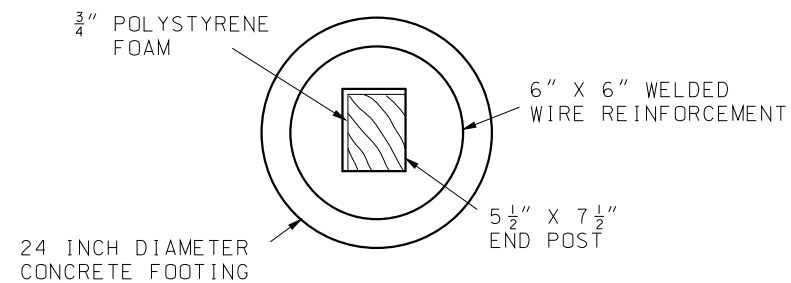
CONCRETE FOUNDATION FOR END ANCHORS



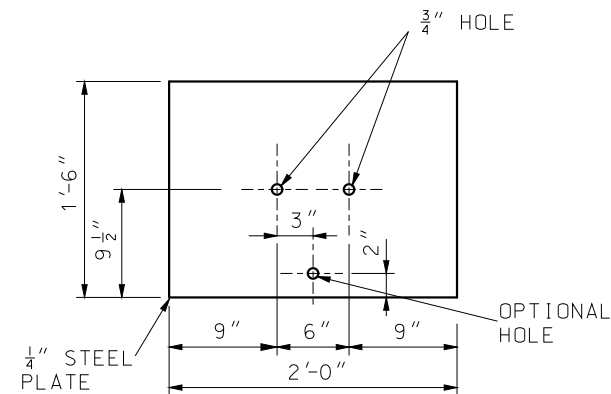
POST 1

STEEL TUBE FOUNDATION FOR END ANCHORS

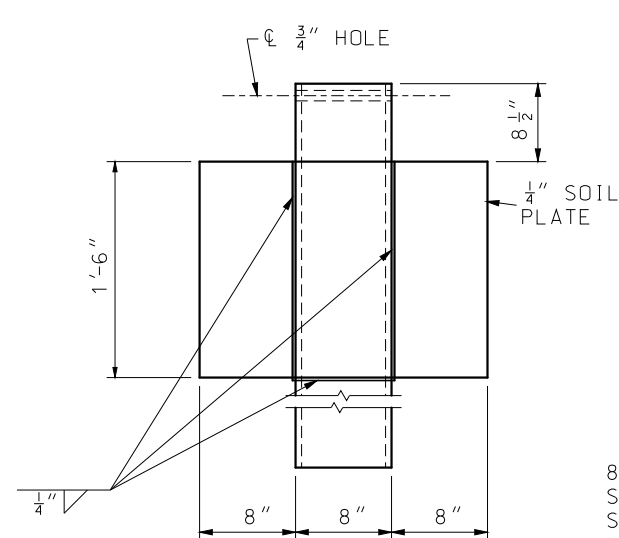
BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO M232, OR THEY MAY BE MECHANICALLY GALVANIZED IN ACCORDANCE WITH AASHTO M232 CLASS C.



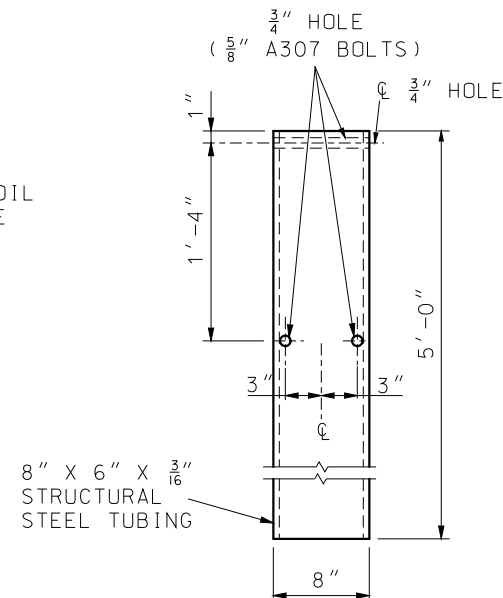
SECTION A-A EXPANDED POLYSTYRENE FOAM INSTALLATION DETAIL



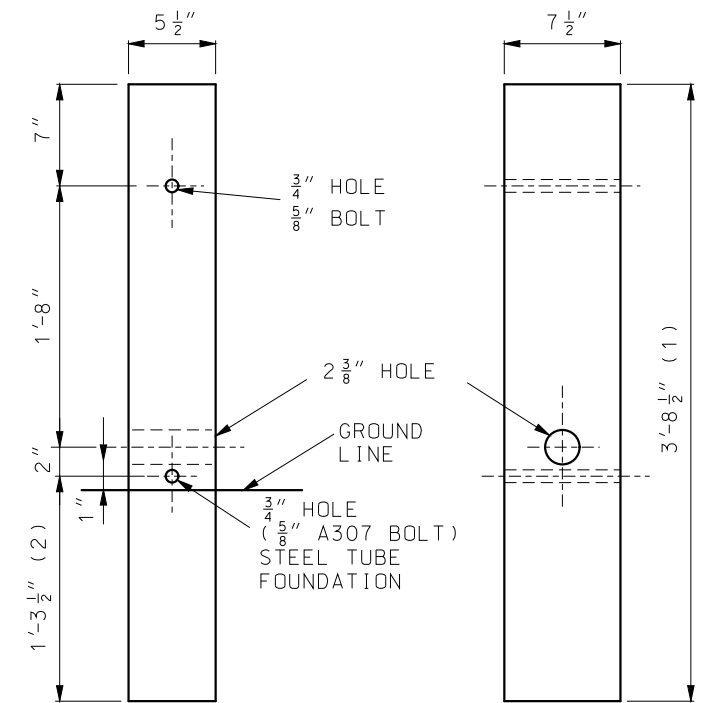
SOIL PLATE



SHOP WELDED SOIL PLATE CONNECTION



STEEL TUBE



FRONT VIEW

SIDE VIEW

WOOD BREAKAWAY POST SEE SECTION 1050


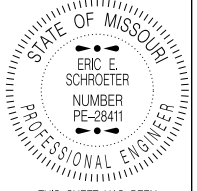
- (1) 5'-11 1/2" FOR CONCRETE FOUNDATION ALTERNATE.
- (2) 3'-8 1/2" FOR CONCRETE FOUNDATION ALTERNATE.

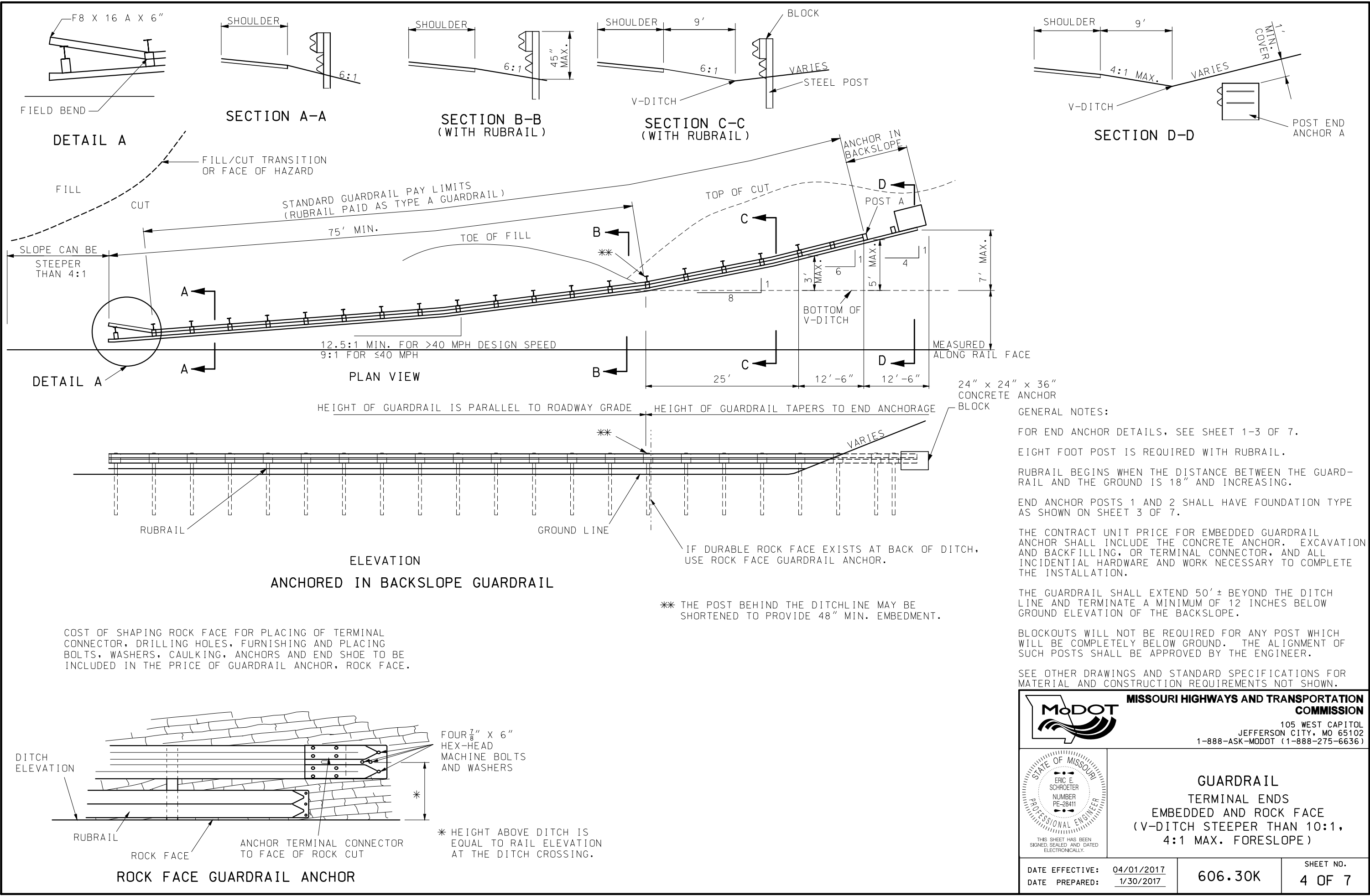
GENERAL NOTES:

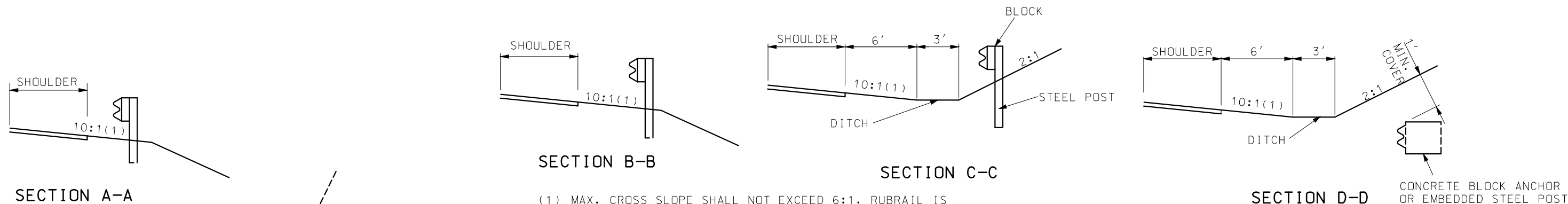
THE CONTRACTOR HAS THE OPTION TO INSTALL WOOD POST 1 AND 2 IN STEEL TUBE OR CONCRETE FOUNDATION.

TRIMMING OF WOOD POST MAY BE NECESSARY FOR STEEL TUBE FOUNDATION.

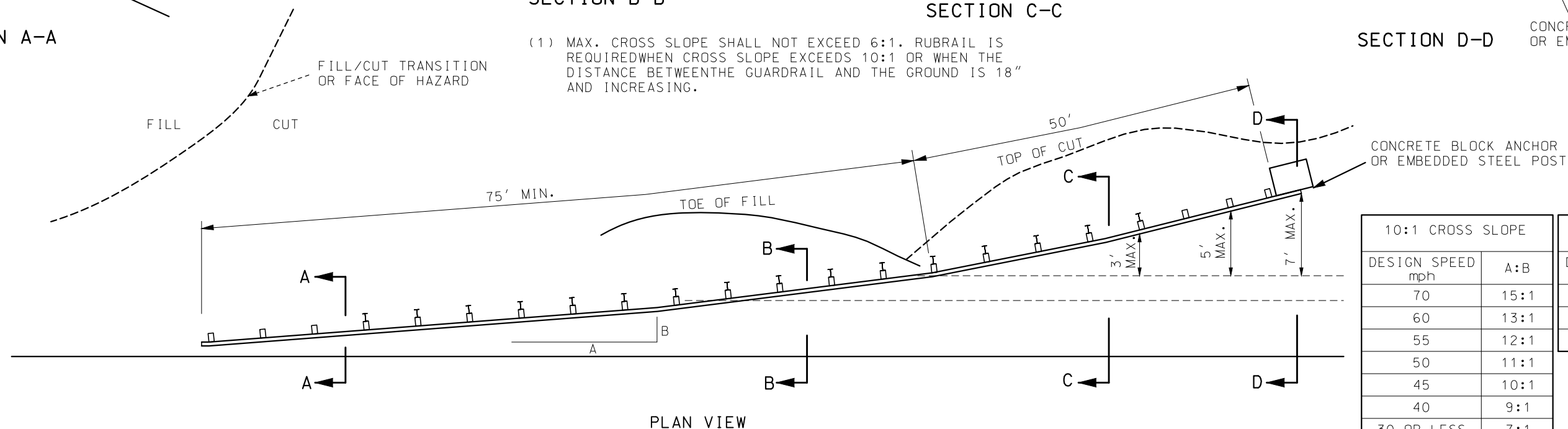
STEEL TUBE FOUNDATIONS SHALL BE DRILLED AND BACK-FILLED WITH A SUITABLE MATERIAL WHEN THE SOIL PLATE IS BOLTED, AS SHOWN, TO THE STEEL TUBE. STEEL TUBE FOUNDATION MAY BE DRIVEN WHEN THE SOIL PLATE IS WELDED, AS SHOWN, TO THE STEEL TUBE.

| | | |
|--|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | GUARDRAIL TERMINAL ANCHOR ENDS | |
| | DATE EFFECTIVE: 04/01/2017 DATE PREPARED: 1/30/2017 | 606.30K |

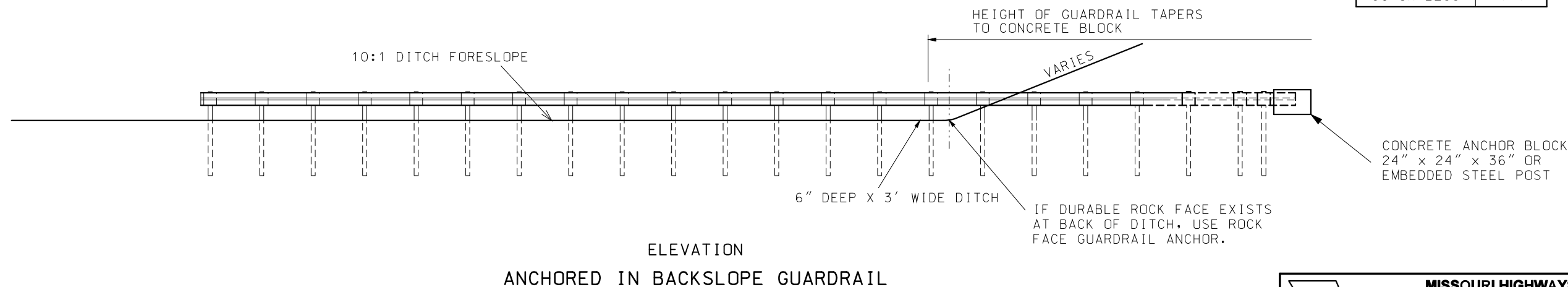




(1) MAX. CROSS SLOPE SHALL NOT EXCEED 6:1. RUBRAIL IS REQUIRED WHEN CROSS SLOPE EXCEEDS 10:1 OR WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.



| 10:1 CROSS SLOPE | | STEEPER THAN 10:1 CROSS SLOPE (1) | |
|------------------|------|-----------------------------------|--------|
| DESIGN SPEED mph | A:B | DESIGN SPEED mph | A:B |
| 70 | 15:1 | 45-70 | 12.5:1 |
| 60 | 13:1 | 40 | 9:1 |
| 55 | 12:1 | 30 OR LESS | 7:1 |
| 50 | 11:1 | | |
| 45 | 10:1 | | |
| 40 | 9:1 | | |
| 30 OR LESS | 7:1 | | |



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER PE-28411

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

GUARDRAIL EMBEDDED TERMINAL ENDS (FLAT DITCH)

DATE EFFECTIVE: 04/01/2017

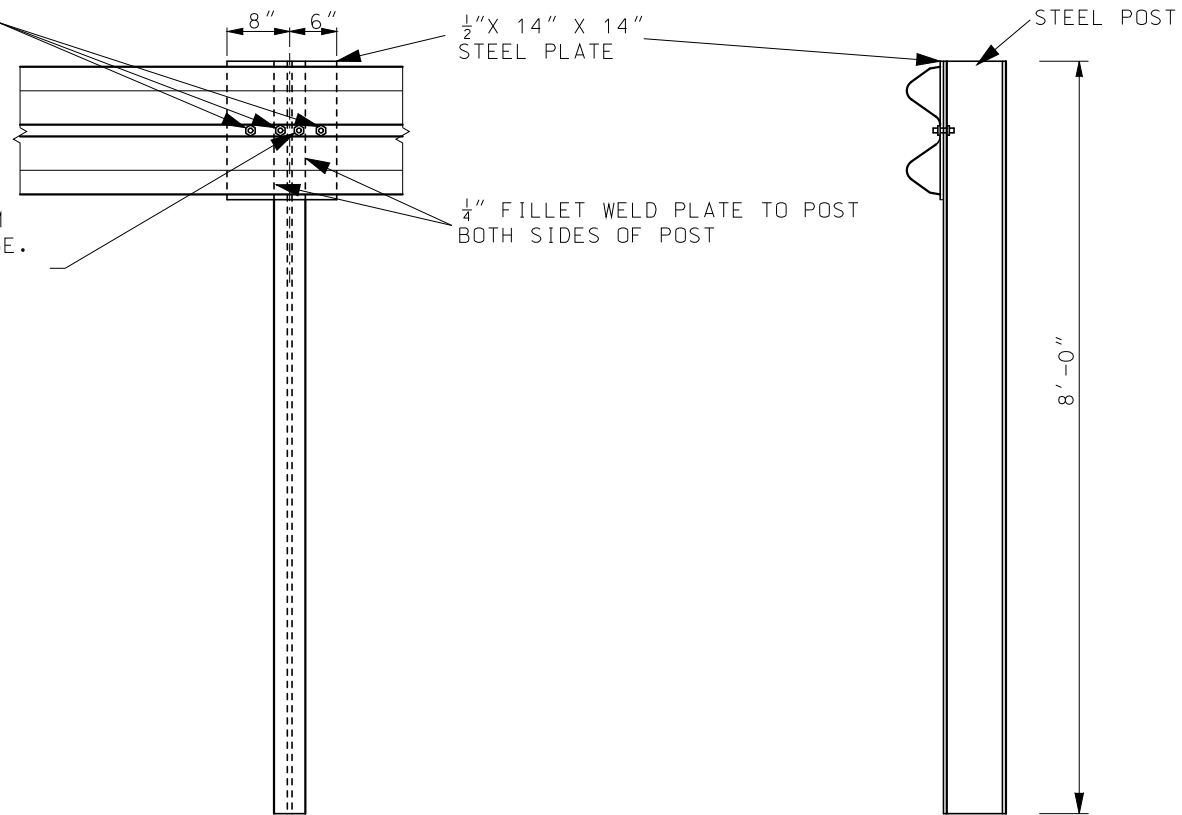
DATE PREPARED: 1/30/2017

606.30K

SHEET NO. 5 OF 7

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH $\frac{7}{8}$ " Ø HEX HEAD BOLTS $1\frac{7}{16}$ " LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

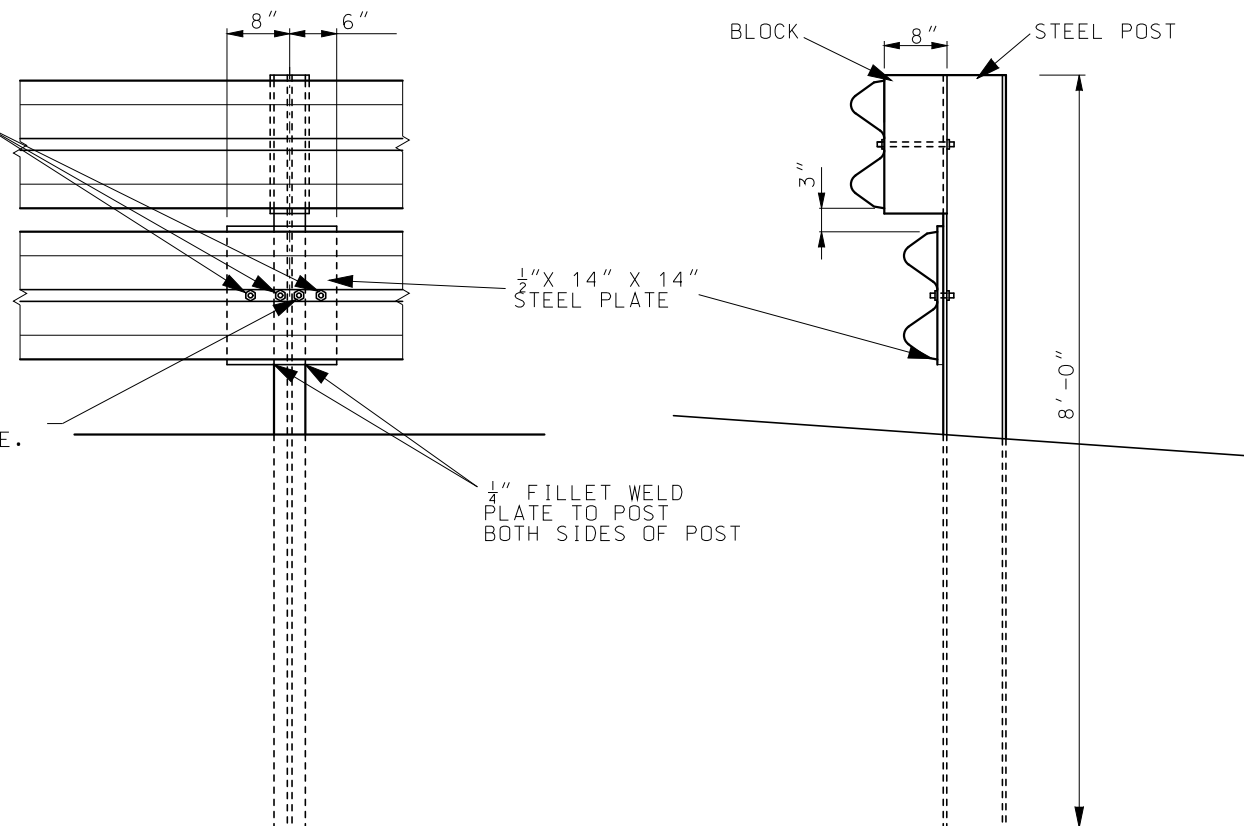
1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH $\frac{7}{8}$ " Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.




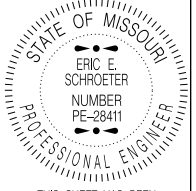
EMBEDDED STEEL POST

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH $\frac{7}{8}$ " Ø HEX HEAD BOLTS $1\frac{7}{16}$ " LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

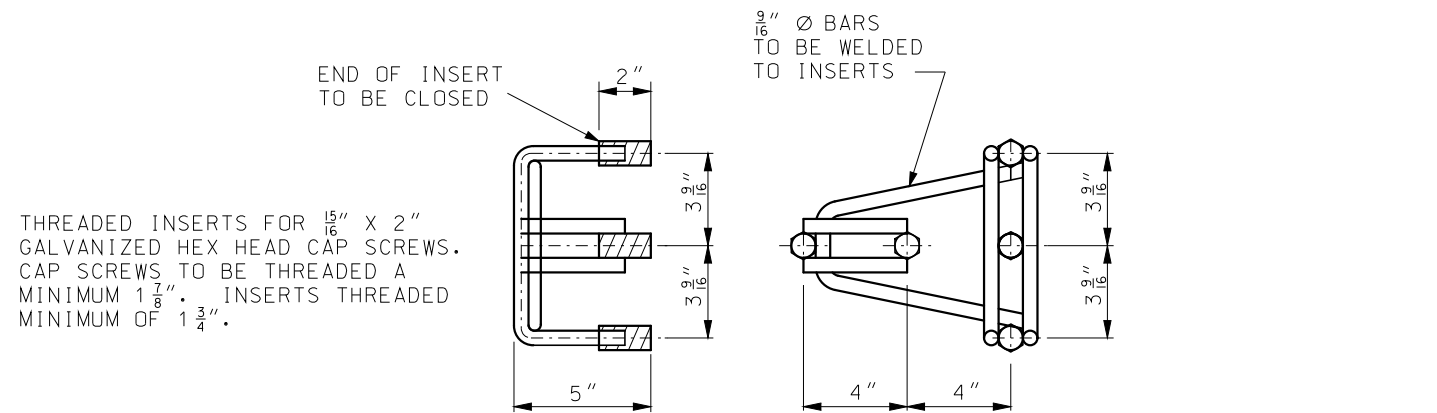
1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH $\frac{7}{8}$ " Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.



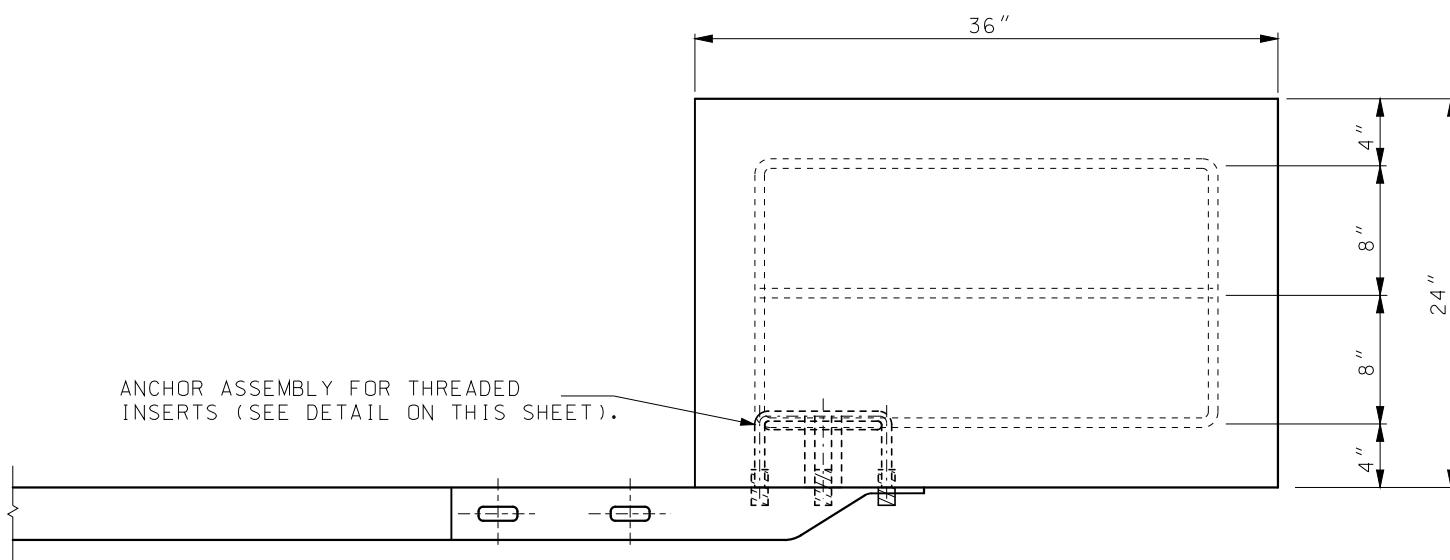
SPECIAL RUBRAIL TO POST CONNECTION AT POST A

| | | | |
|---|--|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | GUARDRAIL EMBEDDED ANCHOR TERMINAL ENDS (STEEL POST OPTION) | |
| DATE EFFECTIVE: 04/01/2017 DATE PREPARED: 1/30/2017 | | 606.30K | SHEET NO. 6 OF 7 |

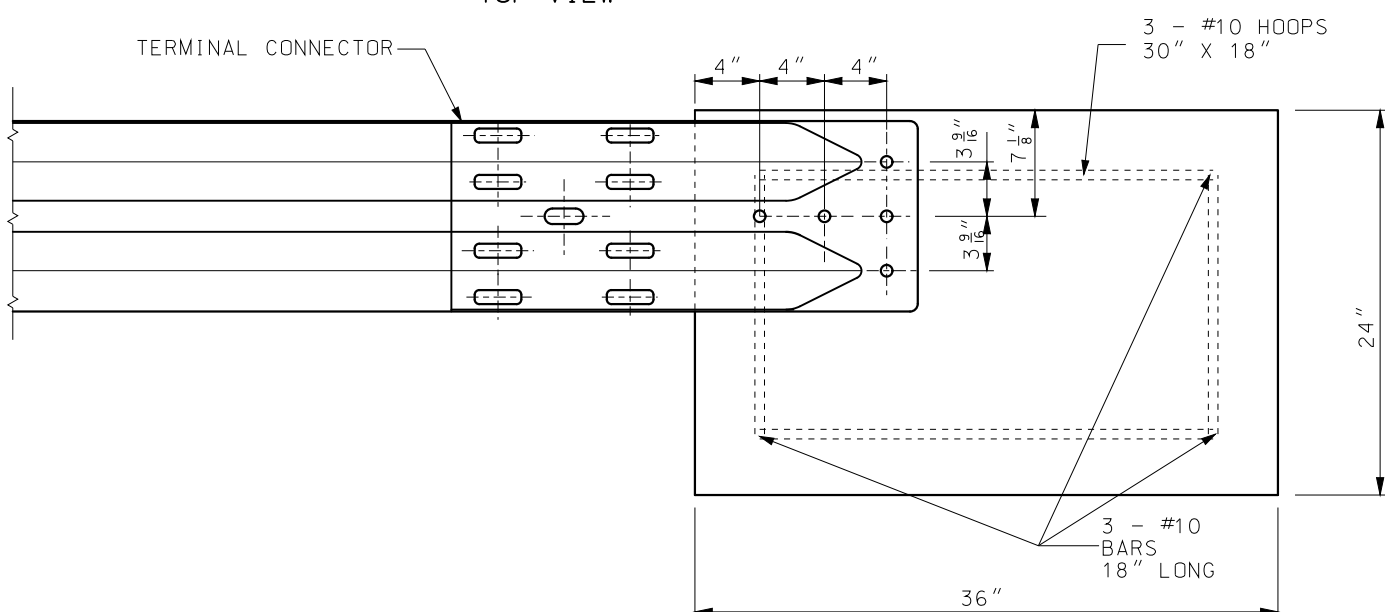
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



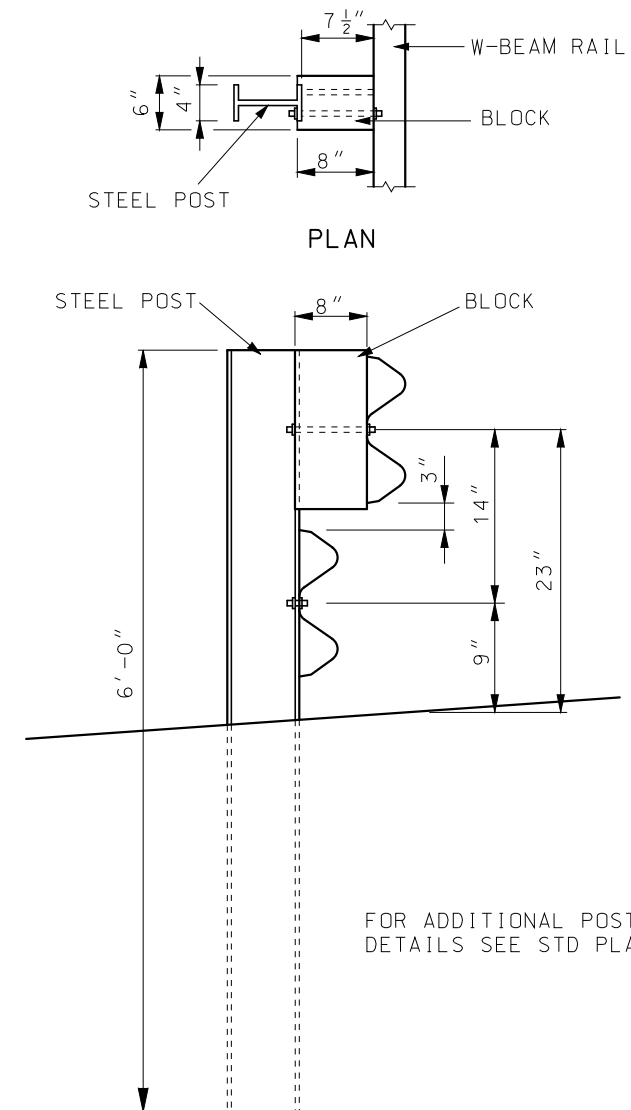
CONCRETE BLOCK ANCHOR
ANCHOR ASSEMBLY



TOP VIEW

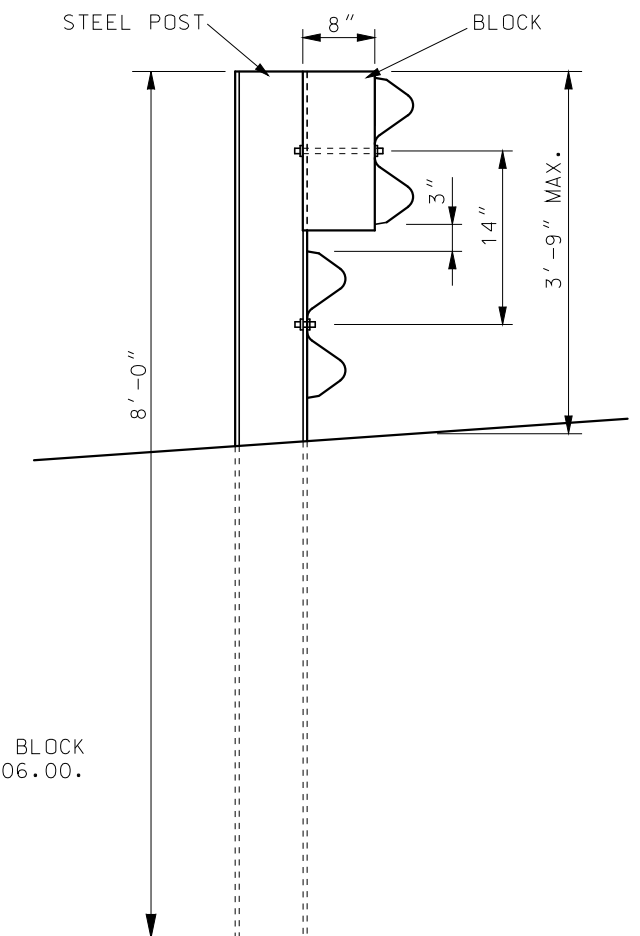


ELEVATION
CONCRETE BLOCK ANCHOR
(24" X 24" X 36")



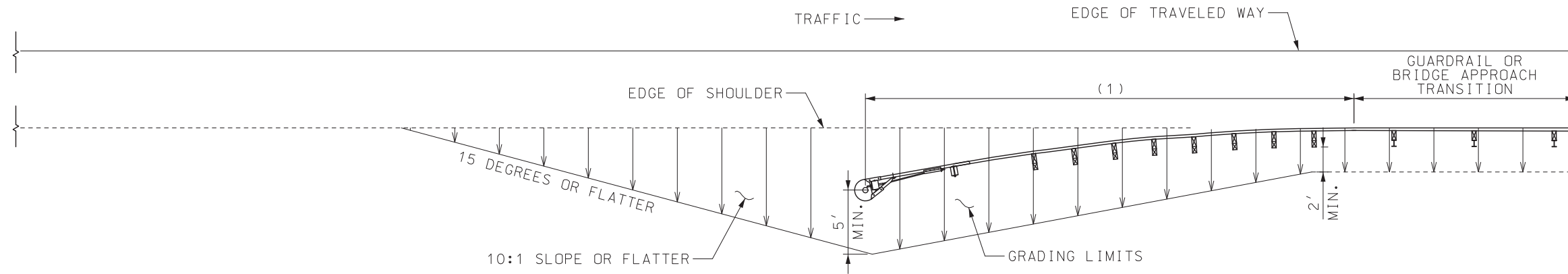
ELEVATION OF 6' POST

STEEL POST AND BLOCK DETAIL

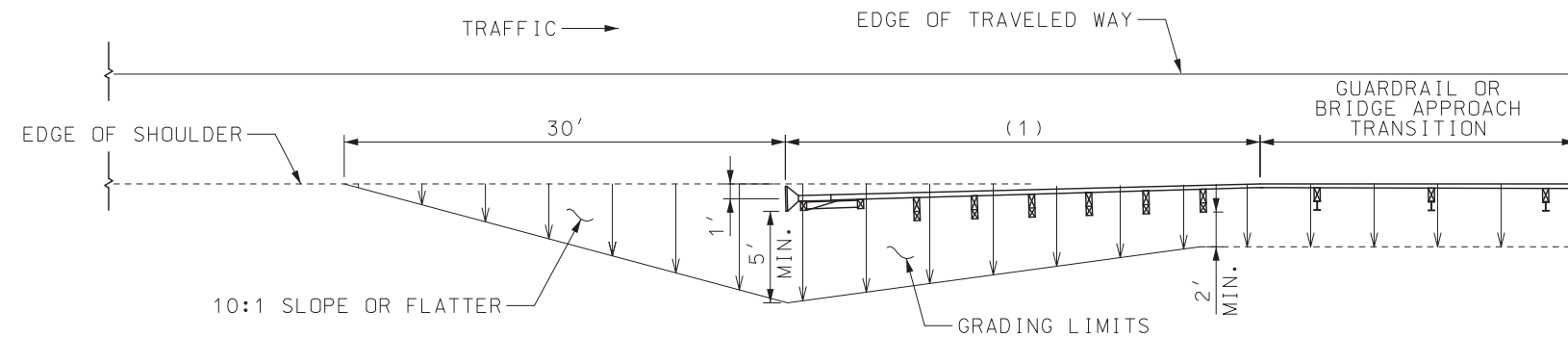


ELEVATION 8' POST

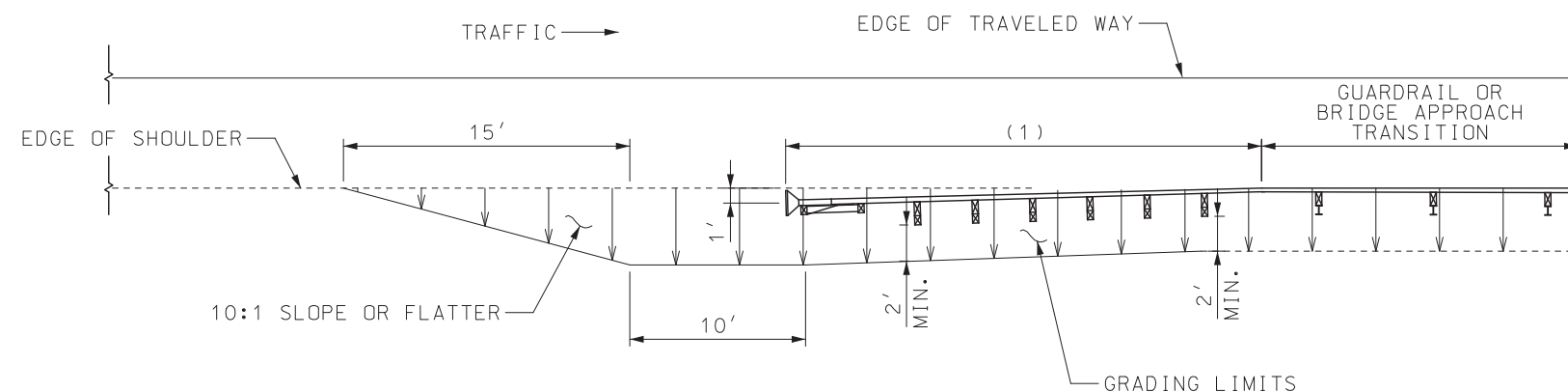
| | | |
|--|---|---------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p align="center">GUARDRAIL EMBEDDED TERMINAL ENDS GENERAL DETAILS</p> | |
| | DATE EFFECTIVE: 04/01/2017 DATE PREPARED: 1/30/2017 | 606.30K |



GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS



ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS


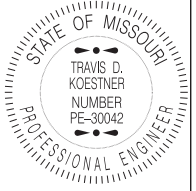
(1) APPROVED CRASHWORTHY END TERMINAL

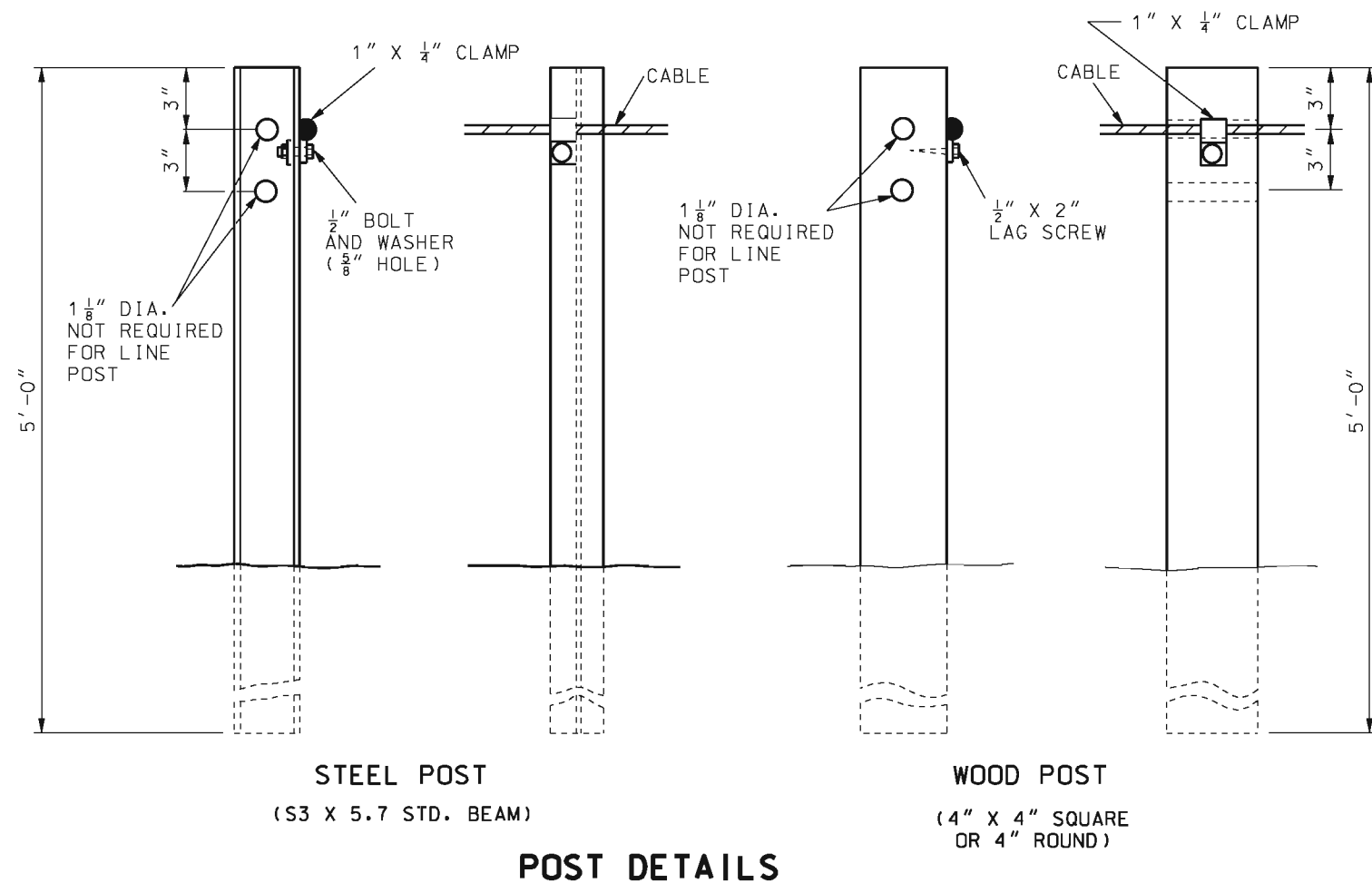
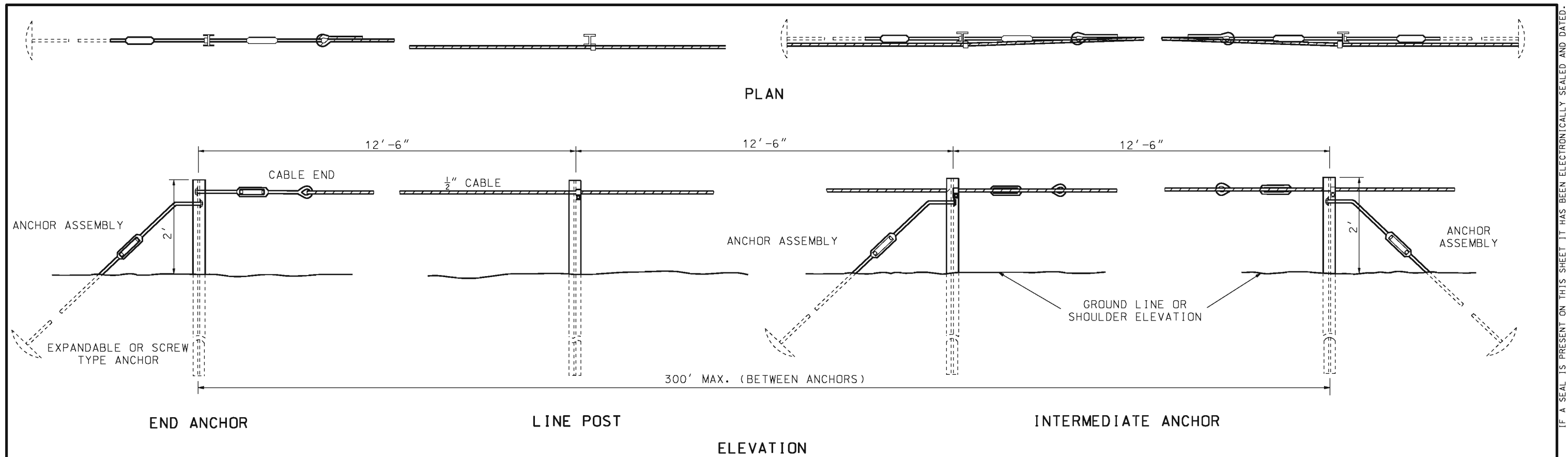
GENERAL NOTES:


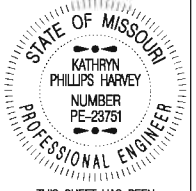
STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE APPROVED CRASHWORTHY END TERMINAL.

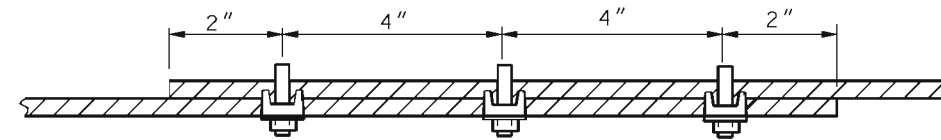
END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>CRASHWORTHY END TERMINALS TYPE A GRADING LIMITS</p> |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 606.31B |
| SHEET NO. 1 OF 1 | |



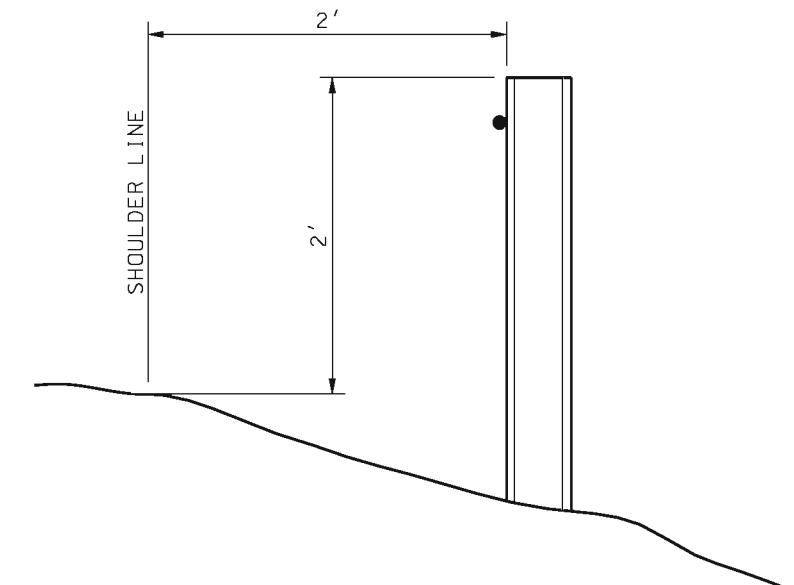
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | ONE-STRAND ACCESS RESTRAINT CABLE |
| DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/21/2009 | 606.40D SHEET NO. 1 OF 2 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

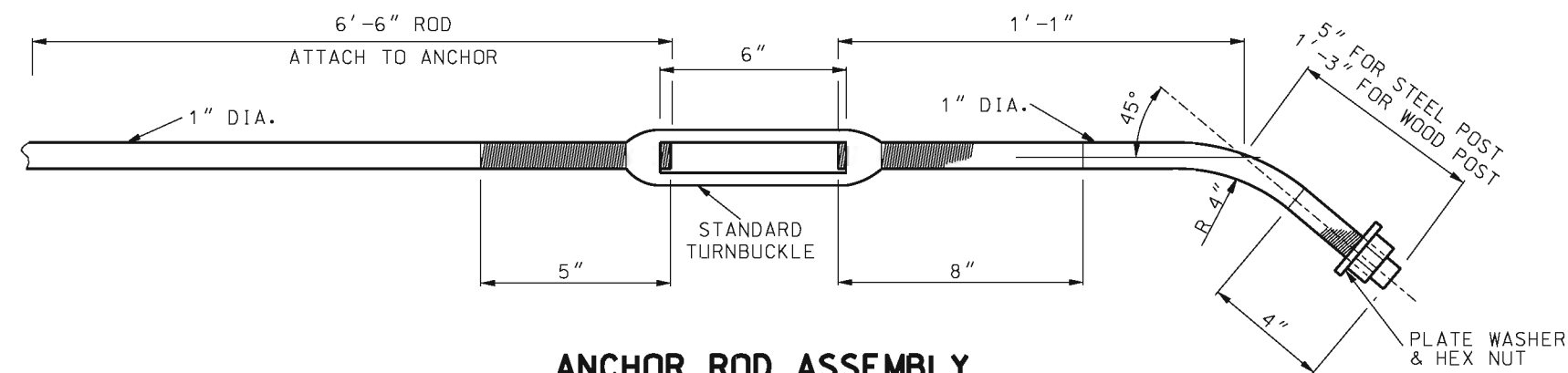


ACCESS-RESTRAINT CABLE GREATER THAN 300 FEET IN LENGTH REQUIRES AN INTER-MEDIATE ANCHOR AS SHOWN.

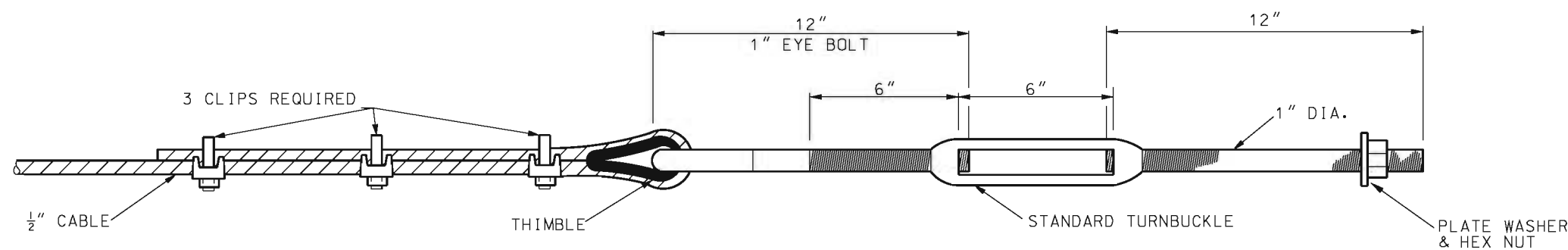
SPLICE DETAIL




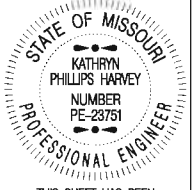
TYPICAL LOCATION SHOULDER INSTALLATION

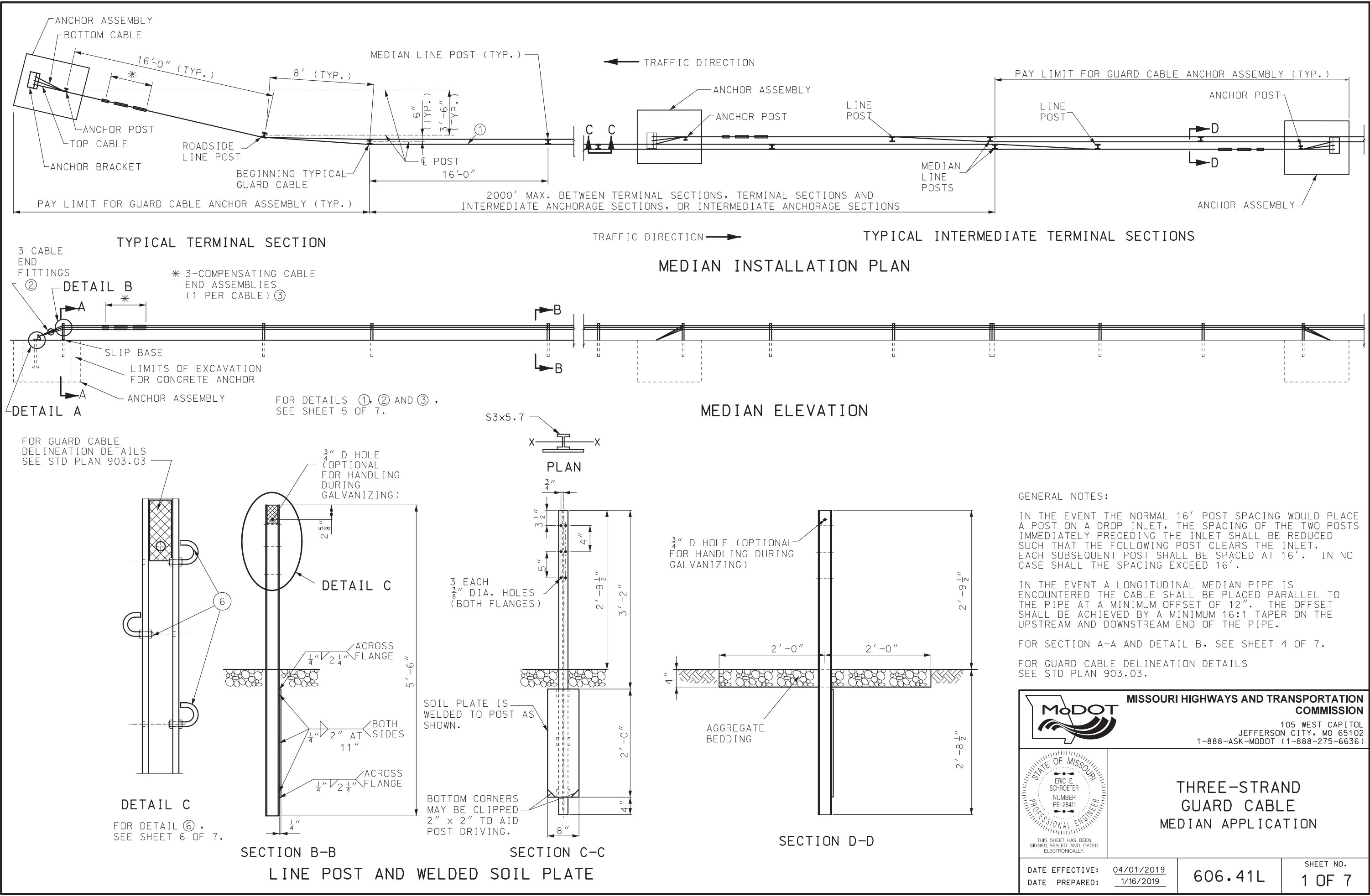


ANCHOR ROD ASSEMBLY

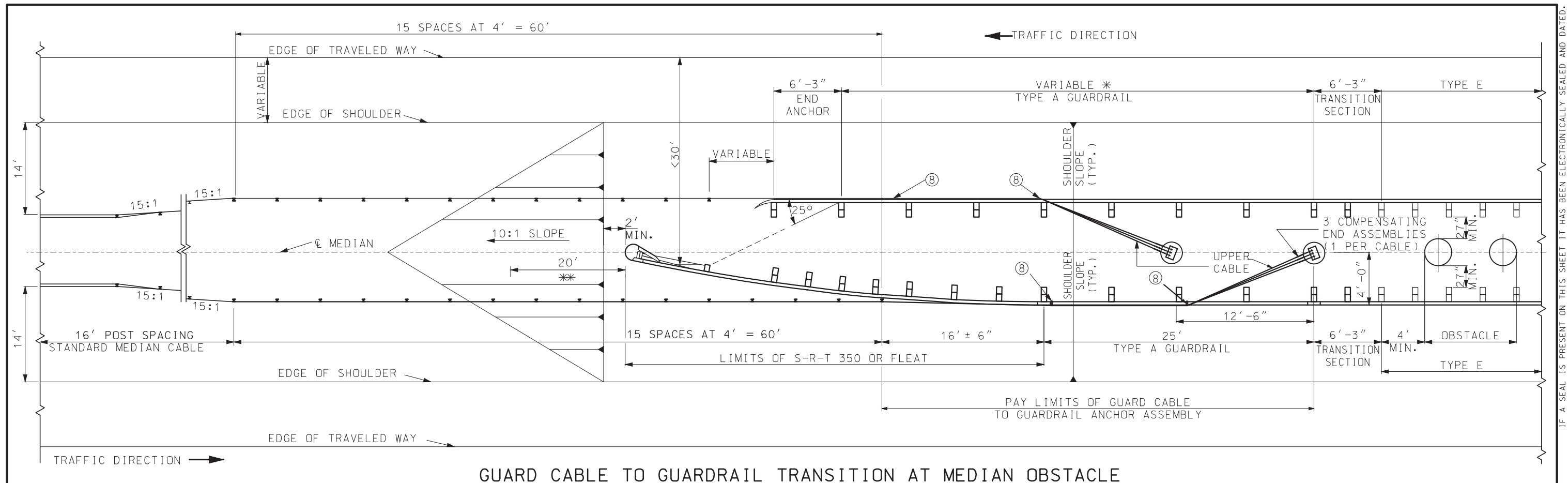


CABLE END


| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | ONE-STRAND ACCESS RESTRAINT CABLE |
| DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/21/2009 | 606.40D |
| SHEET NO. 2 OF 2 | |

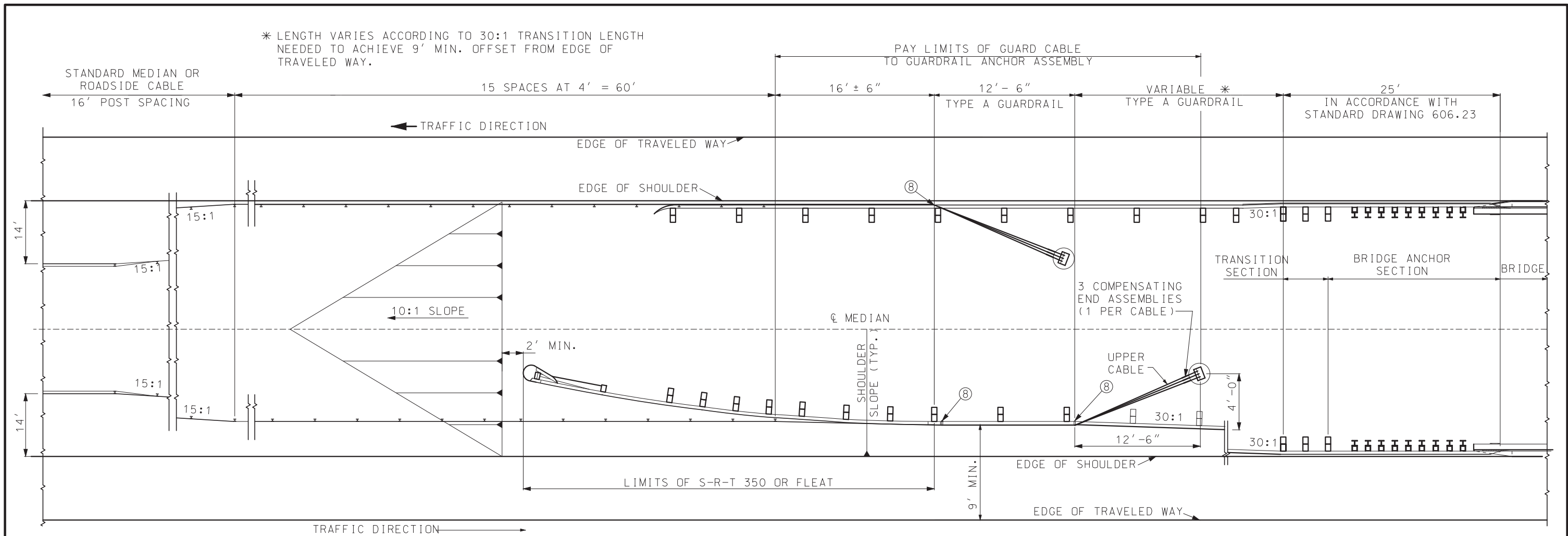


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



- * VARY LENGTH TO ACHIEVE 25° DEFLECTION TO SECOND POST OF S-R-T 350 OR FLEAT.
- ** IF GUARD CABLE IS USED WITH BULLNOSE GUARDRAIL SYSTEM, OR A CRASHWORTHY END TERMINAL ON A MEDIAN LESS THAN 60' IN WIDTH, THE CABLE ANCHORAGE SHALL BE PLACED ON THE MEDIAN CENTERLINE 20' FROM THE NOSE OF THE CRASHWORTHY END TERMINAL OR BULLNOSE GUARDRAIL SYSTEM.

| | | |
|---|--|--|
|  | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |



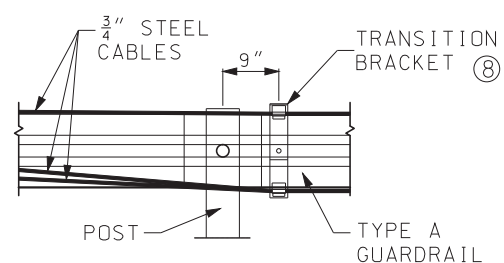
GUARD CABLE TO GUARDRAIL TRANSITION AT MEDIAN BRIDGE END

GENERAL NOTES:

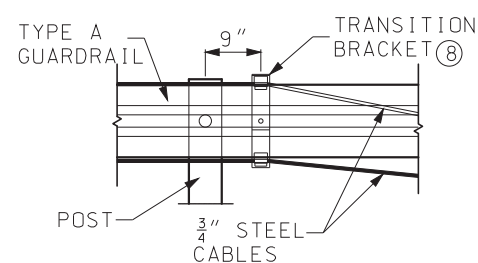
WHEN GUARD CABLE IS LOCATED ALONG THE MEDIAN CENTER-LINE NEAR A BRIDGE END OR CONCRETE BARRIER, IT SHALL BE ANCHORED BEHIND THE GUARDRAIL ASSEMBLY WITH THE GUARD CABLE ANCHOR ASSEMBLY. THE GUARD CABLE ANCHOR SHALL BE CONSTRUCTED SO THAT IT IS PROTECTED BY THE GUARDRAIL.

THIS DRAWING DEPICTS OPTIONS FOR THE ATTACHMENT OF GUARD CABLE TO GUARDRAIL. IT DOES NOT INDICATE THAT TWO RUNS OF CABLE ARE REQUIRED.

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

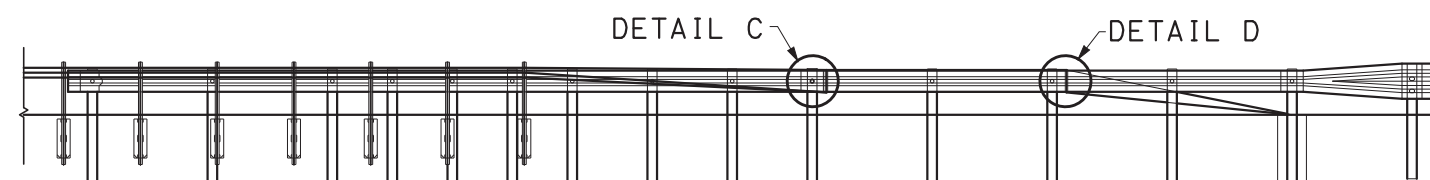


DETAIL C



DETAIL D

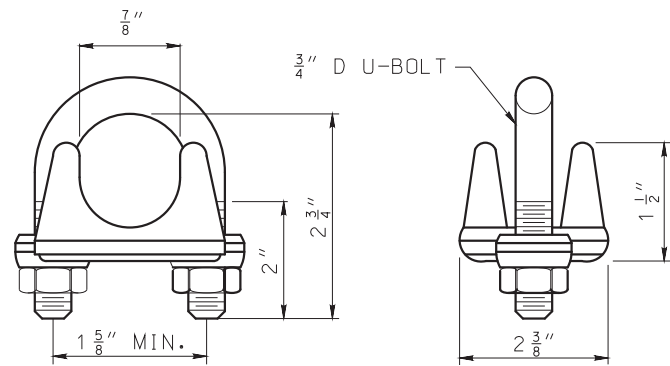
FOR DETAIL ⑧
SEE SHEET 6 OF 7.



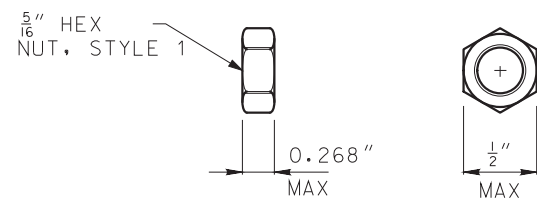
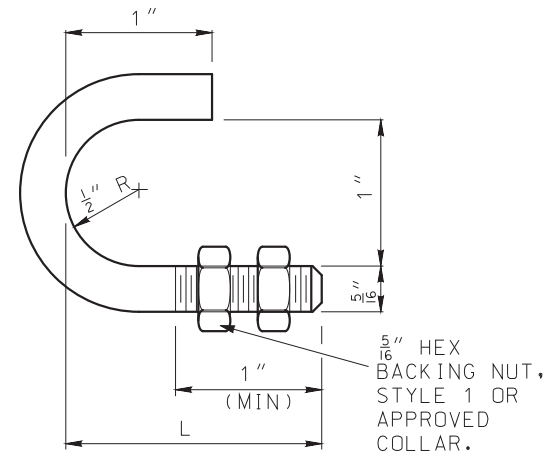
GUARD CABLE TO GUARDRAIL TRANSITION
TERMINAL ANCHOR ASSEMBLY

TYPICAL GUARD CABLE TO GUARDRAIL TRANSITION ELEVATION

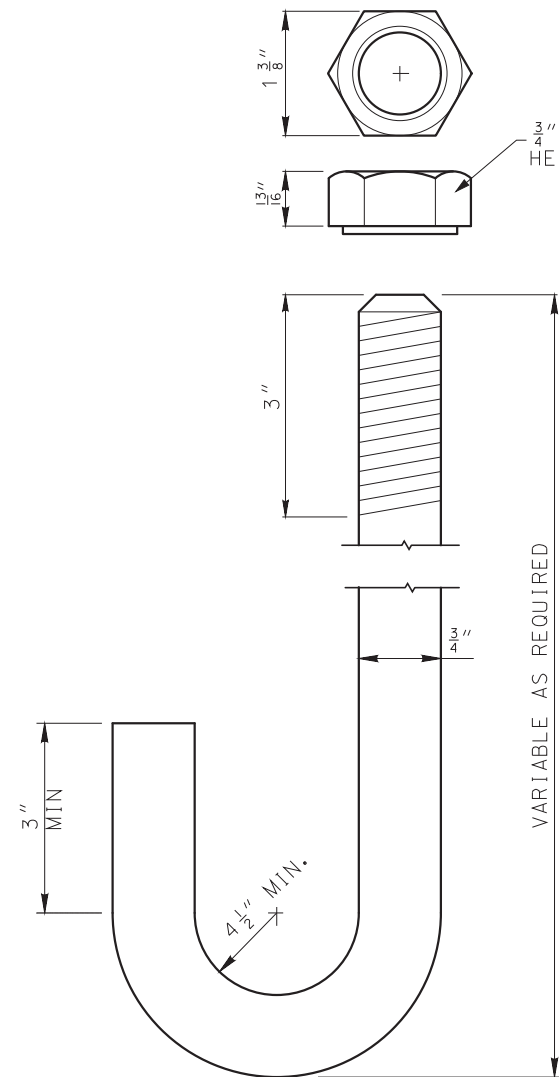
| | |
|--|---------------------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | THREE-STRAND GUARD CABLE |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | SHEET NO. 3 OF 7 |



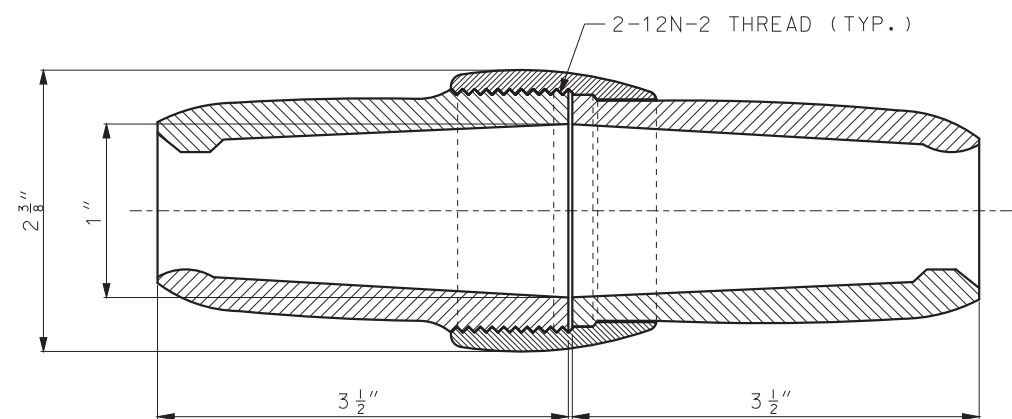
⑤ U-BOLT CABLE CLIPS



⑥ CABLE HOOK BOLT AND NUT

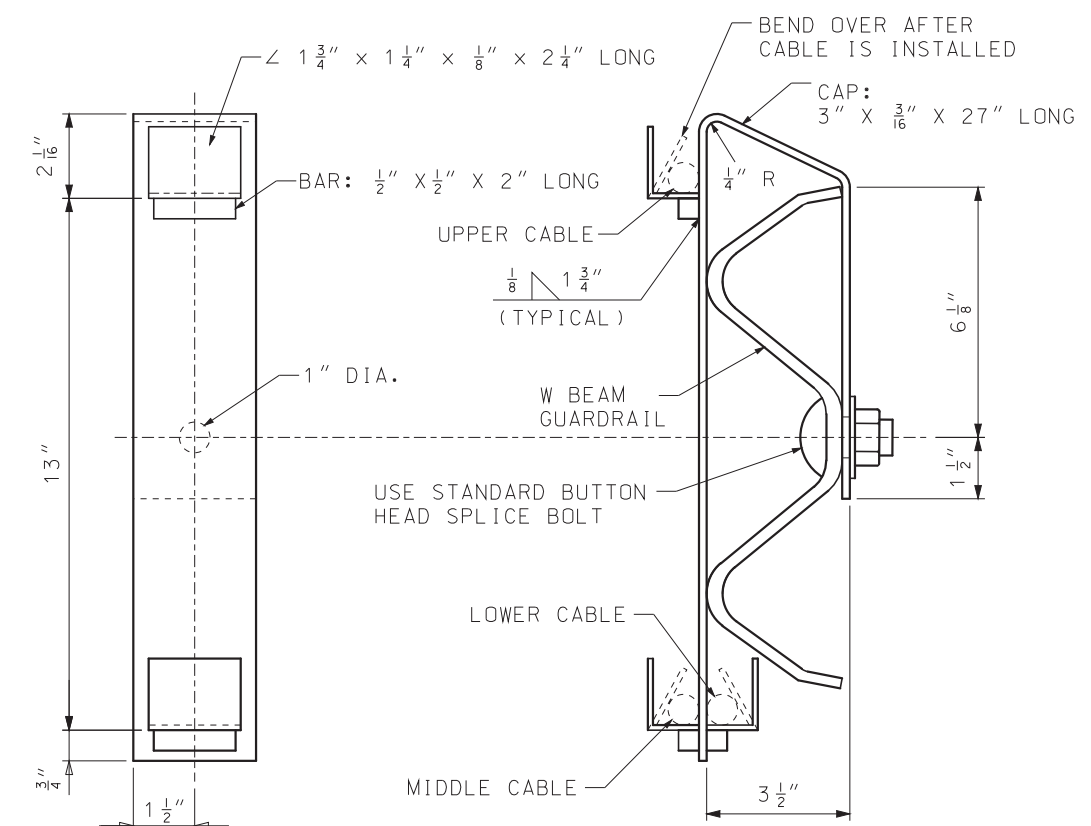
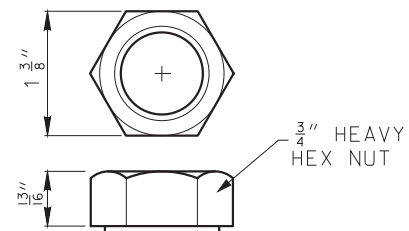


⑦ 25" HOOKED ANCHOR BOLT AND NUT

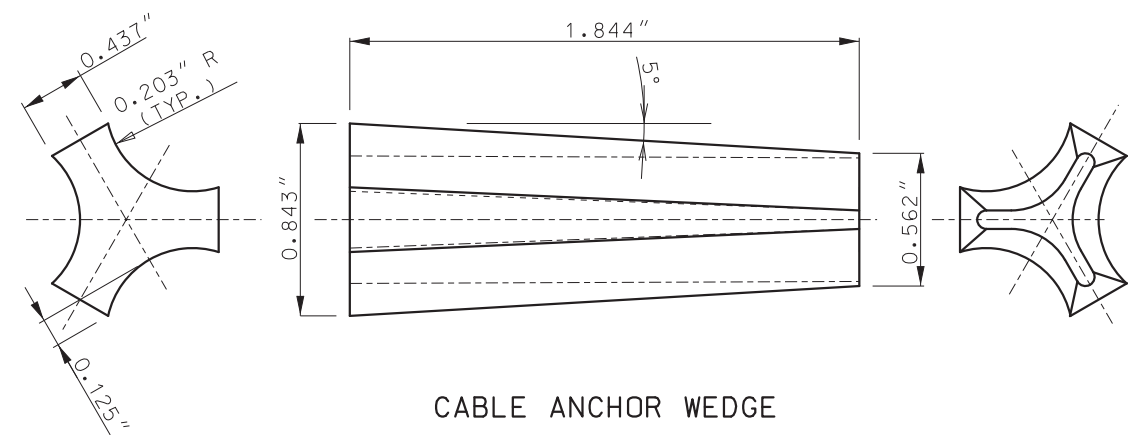


NOTE:
FITTING SPLICE SHALL DEVELOP THE FULL
STRENGTH OF THE CABLE (25,000 LB.).

CABLE SPLICE

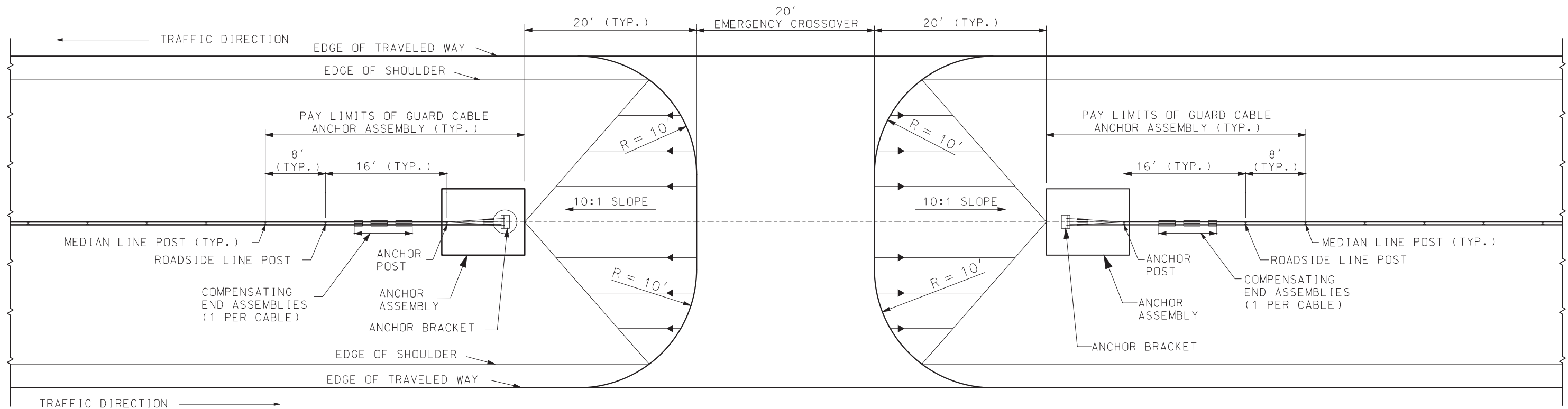


⑧ CABLE TRANSITION BRACKET

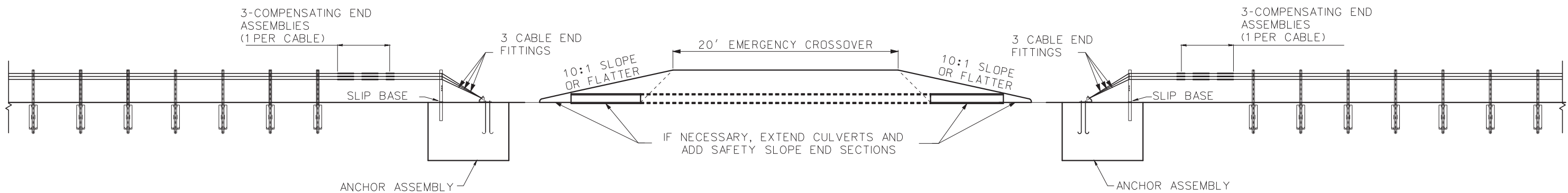


CABLE ANCHOR WEDGE

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|--|---------------------------------|----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | THREE-STRAND GUARD CABLE | |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.41L | SHEET NO. 6 OF 7 |



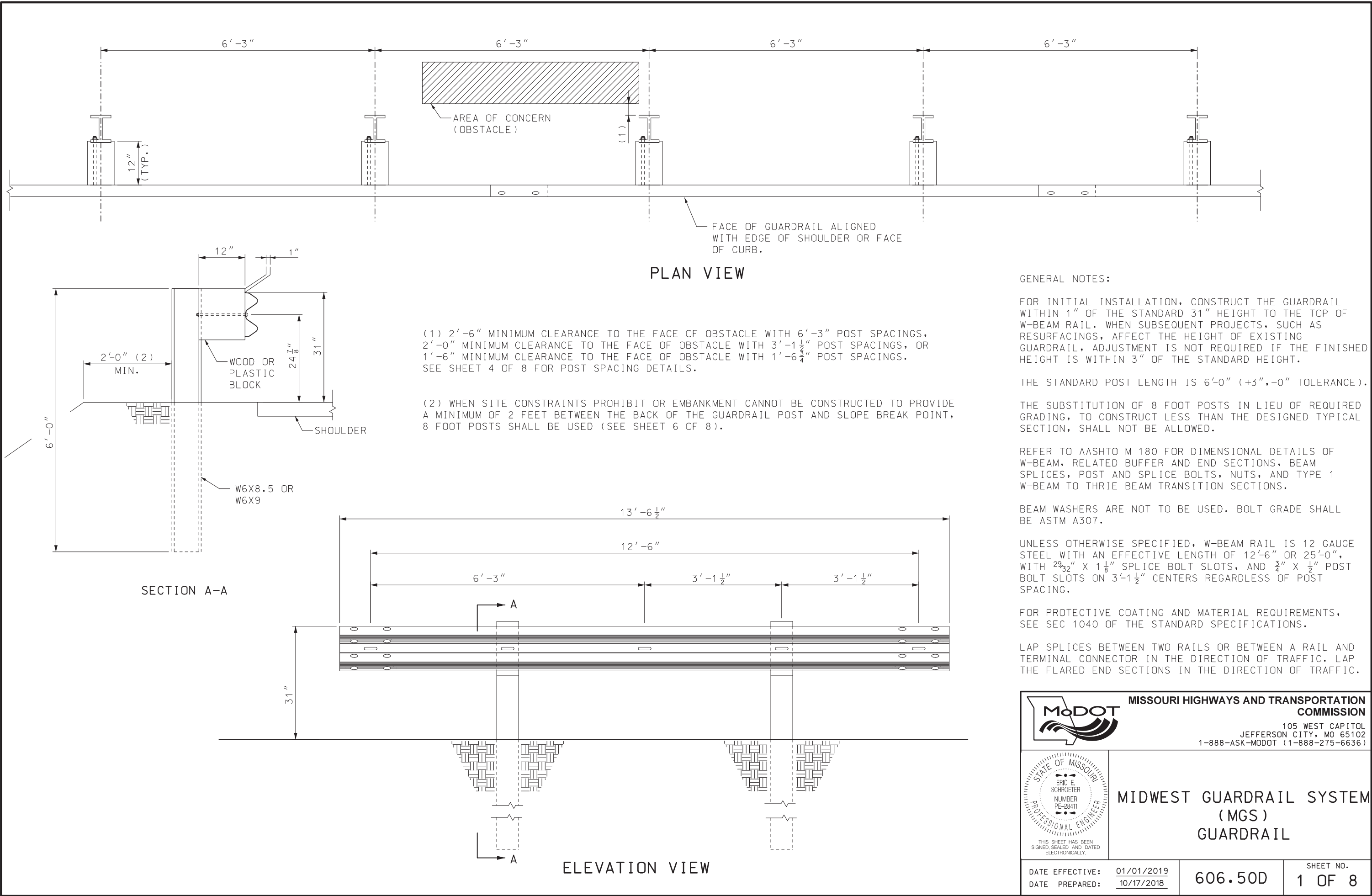
PLAN




PROFILE

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | THREE-STRAND GUARD CABLE TRANSITION AT MEDIAN OPENING |
| DATE EFFECTIVE: 10/01/2017 DATE PREPARED: 8/8/2017 | SHEET NO. 7 OF 7 |

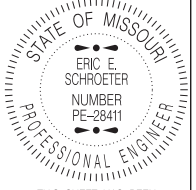
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.





MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

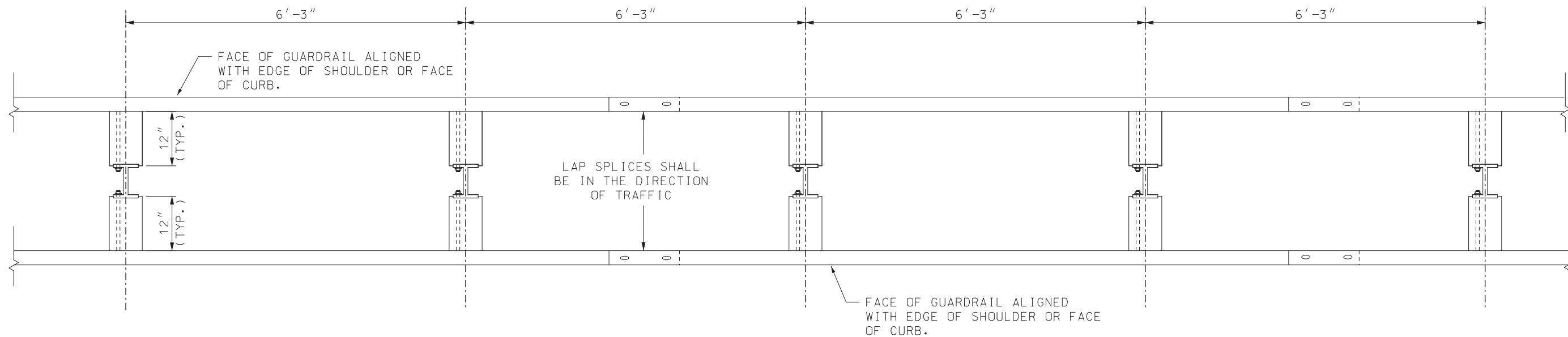
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



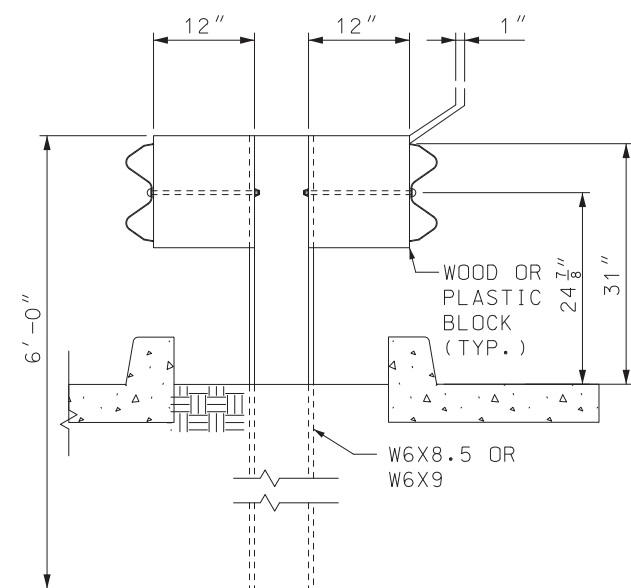
MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

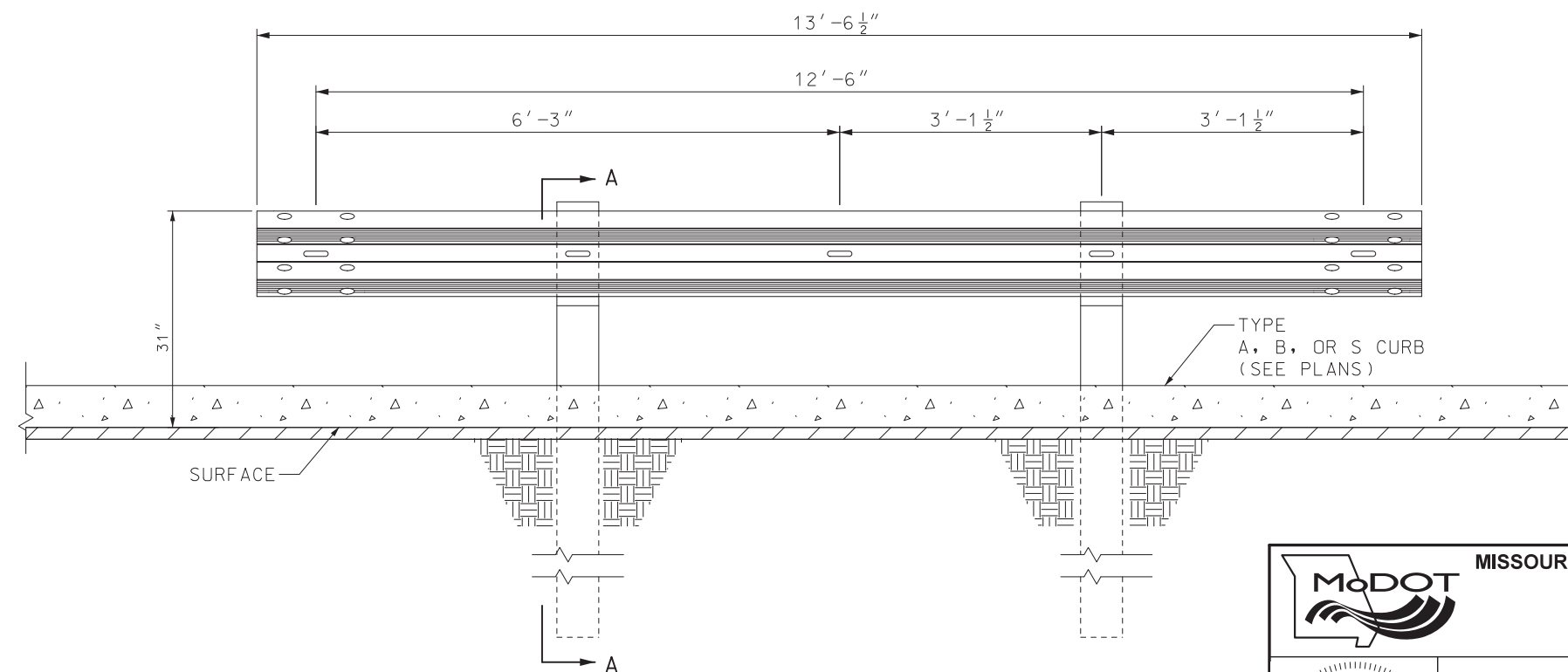
| | | | |
|-----------------|------------|---------|---------------------|
| DATE EFFECTIVE: | 01/01/2019 | 606.50D | SHEET NO. 1 OF 8 |
| DATE PREPARED: | 10/17/2018 | | |




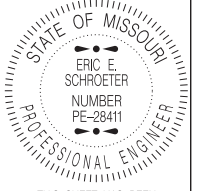
PLAN VIEW

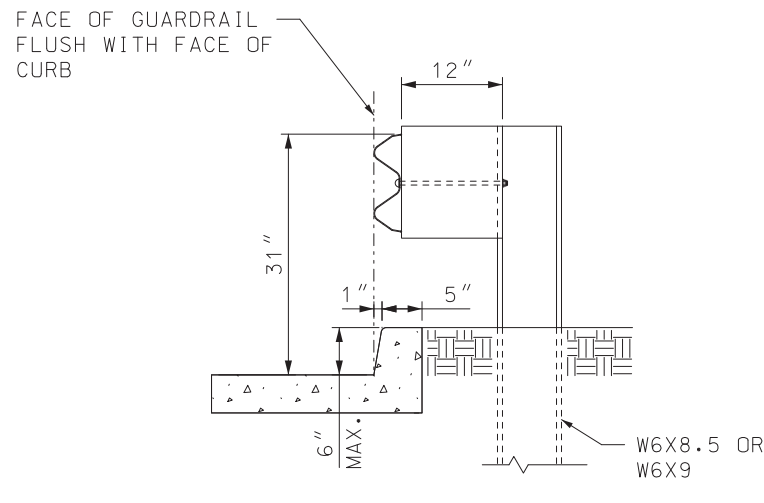


SECTION A-A

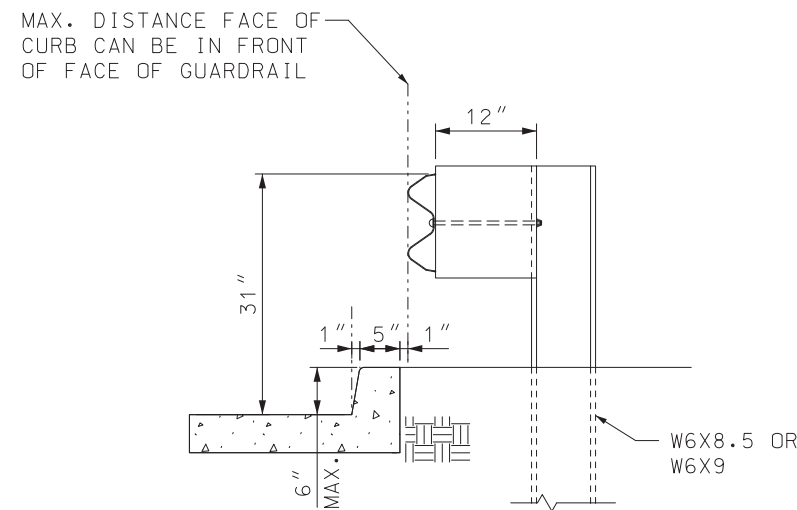


ELEVATION VIEW

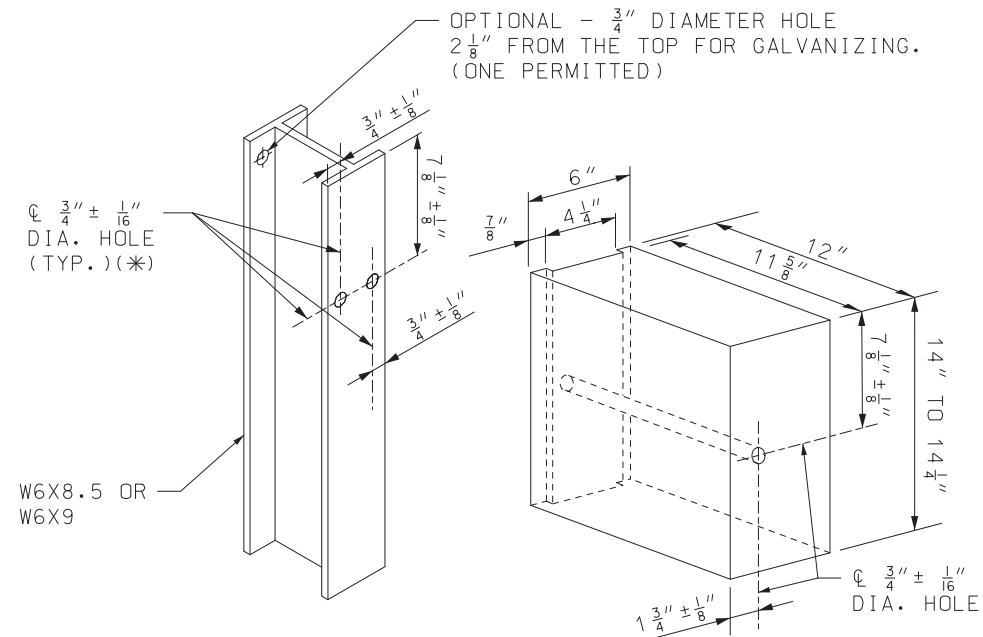
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) DOUBLE FACED GUARDRAIL |
| DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018 | 606.50D |
| SHEET NO. 2 OF 8 | |



MGS GUARDRAIL AT
CURB



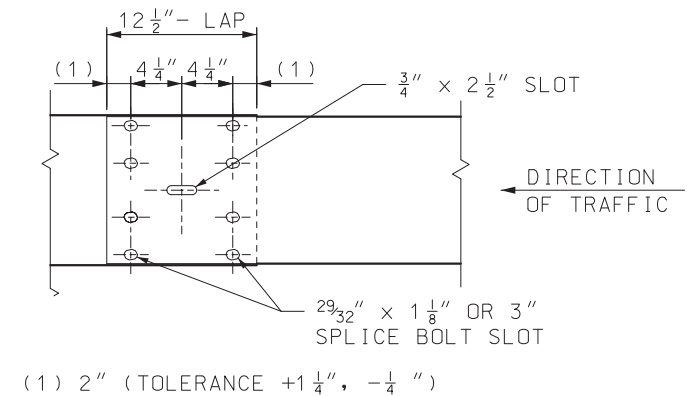
ALTERNATE MGS
AT CURB



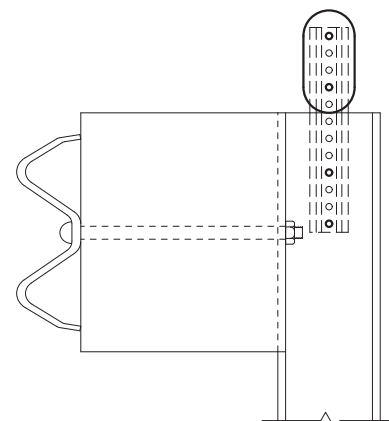
FOR STEEL POST AND NOTCHED WOOD OR PLASTIC BLOCK

HOLE PUNCHING DETAIL

(*) TWO HOLES CAN BE PROVIDED ON EACH FLANGE OF POST, ONLY ONE IS REQUIRED
FOR FLANGE OF POST THAT HAS A BLOCK ATTACHMENT.



RAIL ELEMENT SPLICE
DETAIL



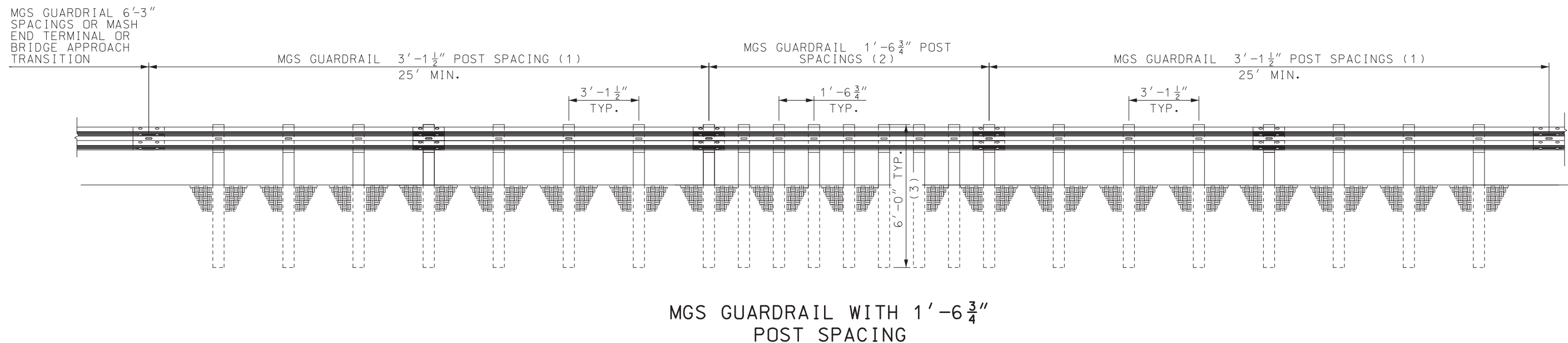
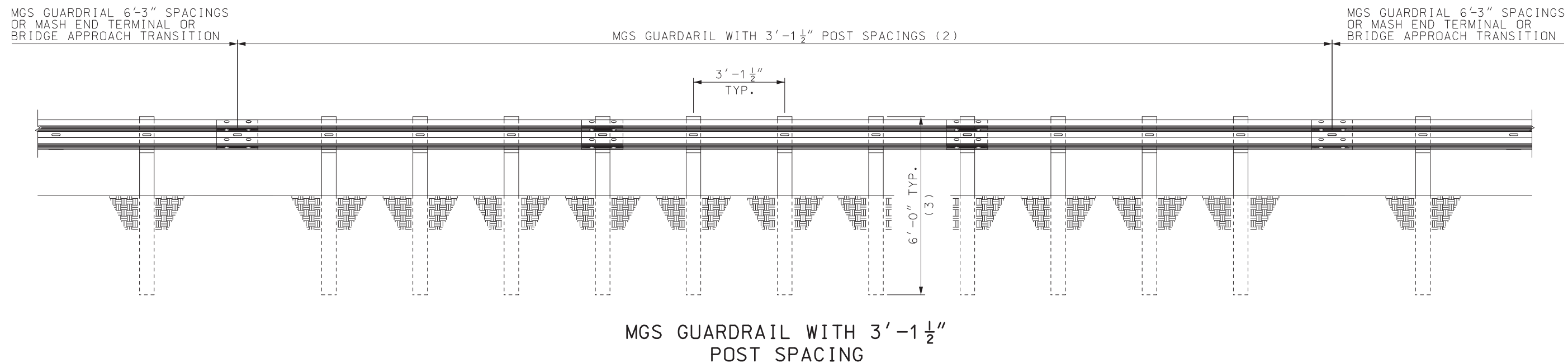
DELINEATORS ON GUARDRAIL

GENERAL NOTES:

FOR GUARDRAIL DELINEATION DETAILS SEE
STD PLAN 903.03.

| | | | |
|---|---------|--|--|
| | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | | MIDWEST GUARDRAIL SYSTEM (MGS) POST AND BLOCK | |
| DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018 | 606.50D | SHEET NO. 3 OF 8 | |



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

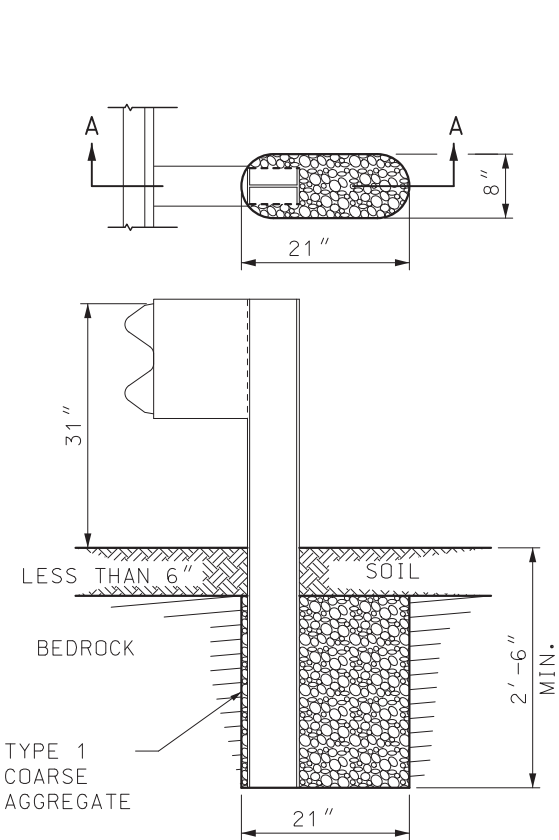


- (1) 25 FEET OF MGS 3'-1 1/2" POST SPACING GUARDRAIL IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF 1'-6 3/4" POST SPACING MGS GUARDRAIL.
- (2) USE AS MANY SEGMENTS AS NECESSARY TO SHIELD THE AREA OF CONCERN.
- (3) REDUCED POST SPACING SHALL USE 6'-0" POSTS MAX. ANY DEVIATION OF 6'-0" POSTS WILL ONLY BE ALLOWED IN ACCORDANCE WITH SPECIAL INSTALLATIONS AS SHOWN ON SHEET 5 OF 8.

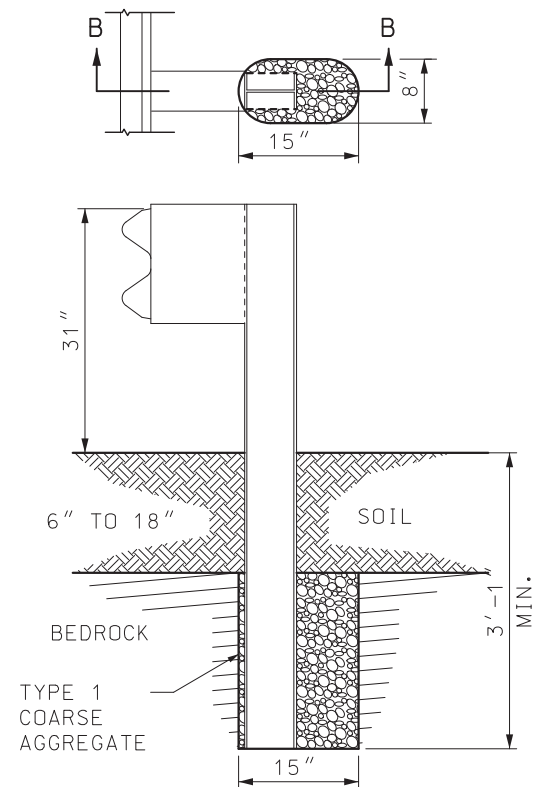
GENERAL NOTES:

- 8' POSTS CANNOT BE USED WHEN:
- POST SPACING IS LESS THAN 6'-3"
 - WITHIN CRASHWORTHY END TERMINALS (SEE MANUFACTURERS DRAWINGS)
 - WITHIN VERTICAL BARRIER TRANSITIONS (606.60)
 - WITHIN BRIDGE APPROACH TRANSITIONS (606.70)

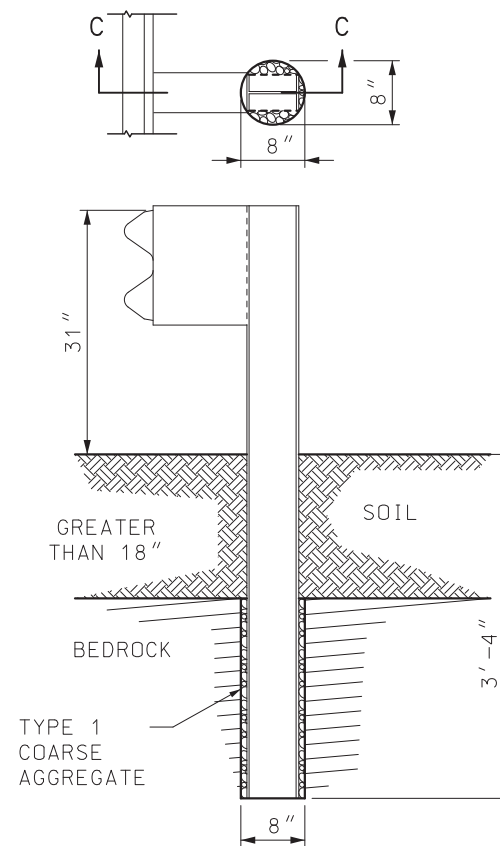
| | | | |
|---|---------------------------------------|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) | | |
| | REDUCED POST SPACINGS | | |
| DATE EFFECTIVE: | 01/01/2019 | 606.50D | SHEET NO. 4 OF 8 |
| DATE PREPARED: | 10/17/2018 | | |



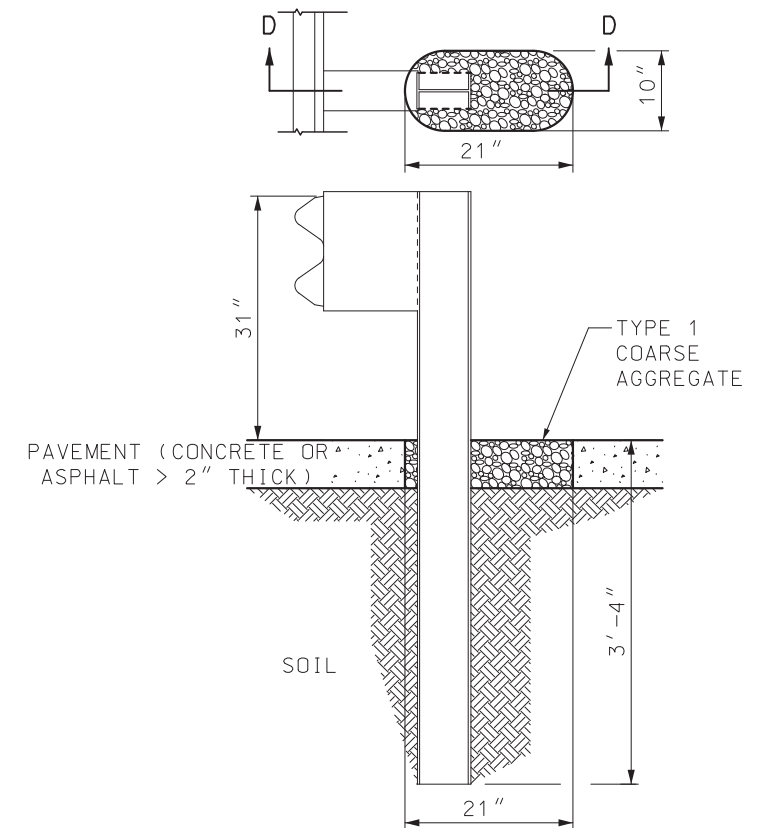
SECTION A-A
ROCK ENCOUNTERED
UP TO 6" BENEATH SURFACE



SECTION B-B
ROCK ENCOUNTERED
6" TO 18" BENEATH SURFACE

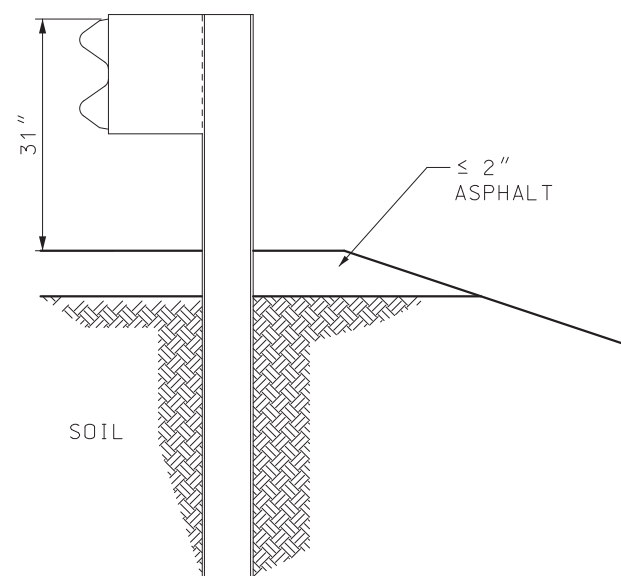


SECTION C-C
ROCK ENCOUNTERED MORE
THAN 18" BENEATH SURFACE



SECTION D-D
SETTING POST THROUGH PAVEMENT
(CONCRETE OR ASPHALT > 2" THICK)

SETTING POST IN SOLID ROCK



SETTING POST THROUGH ASPHALT $\leq 2"$ THICK

GENERAL NOTES:

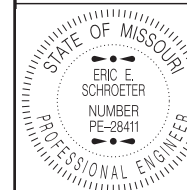
HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SEC 712 OF THE STANDARD SPECIFICATIONS.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



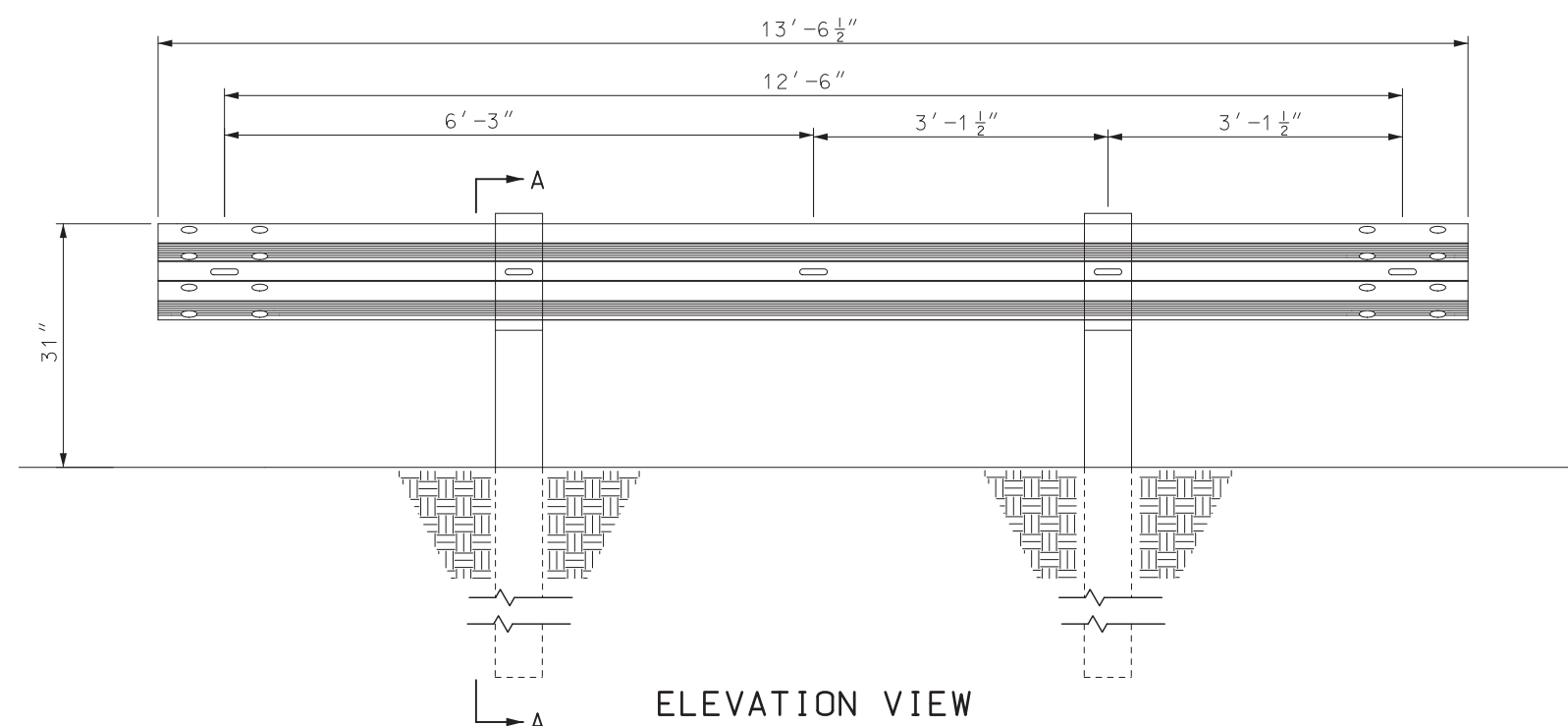
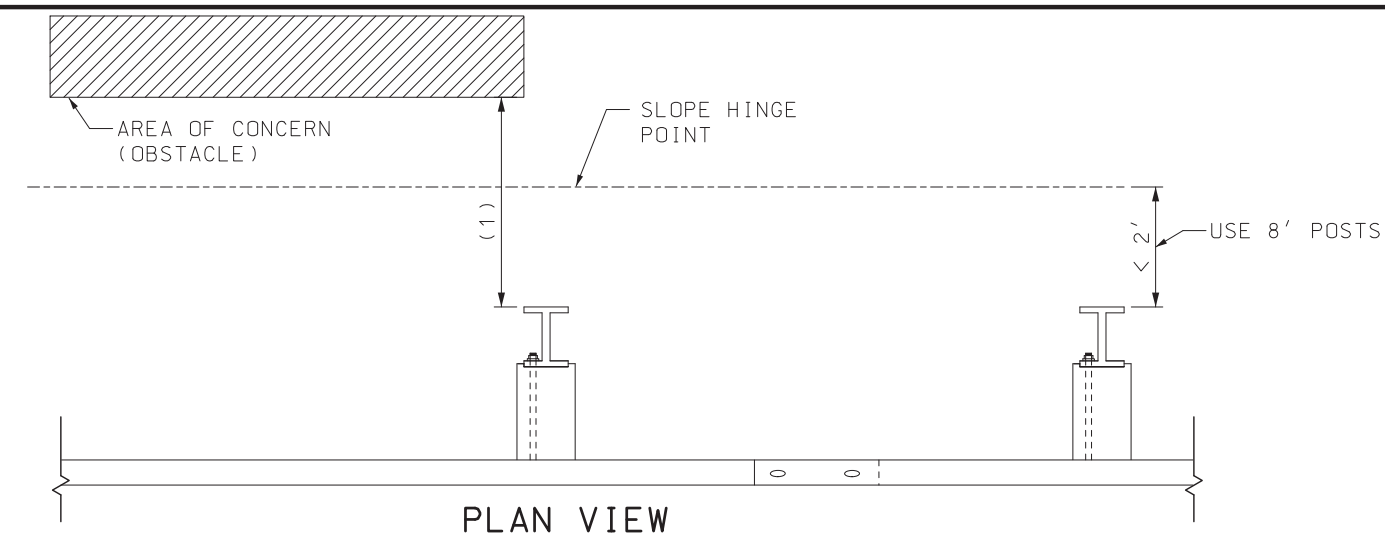
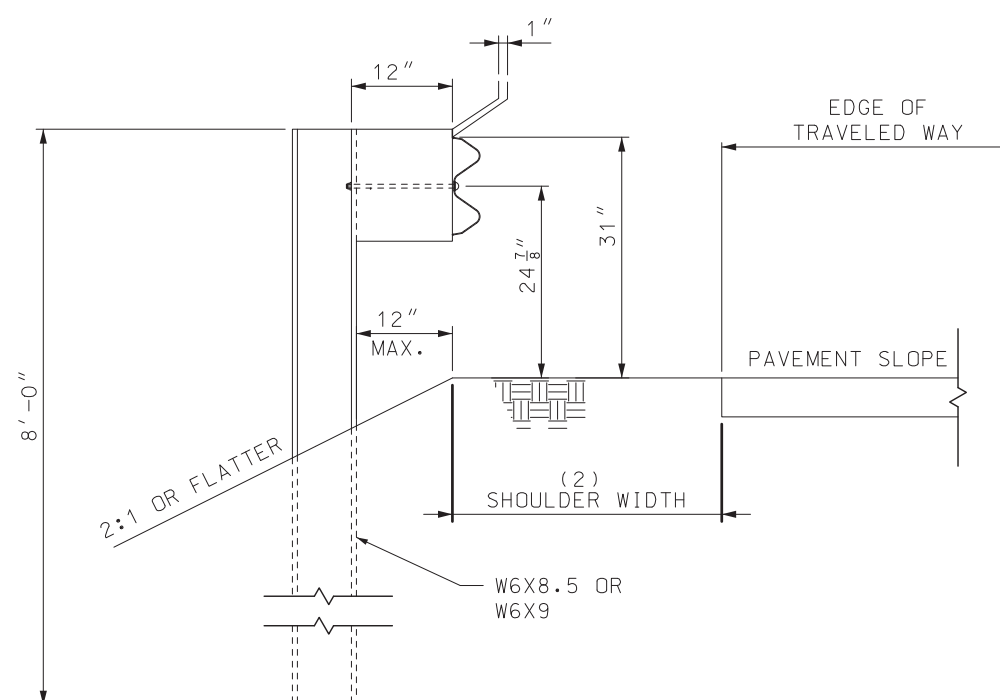
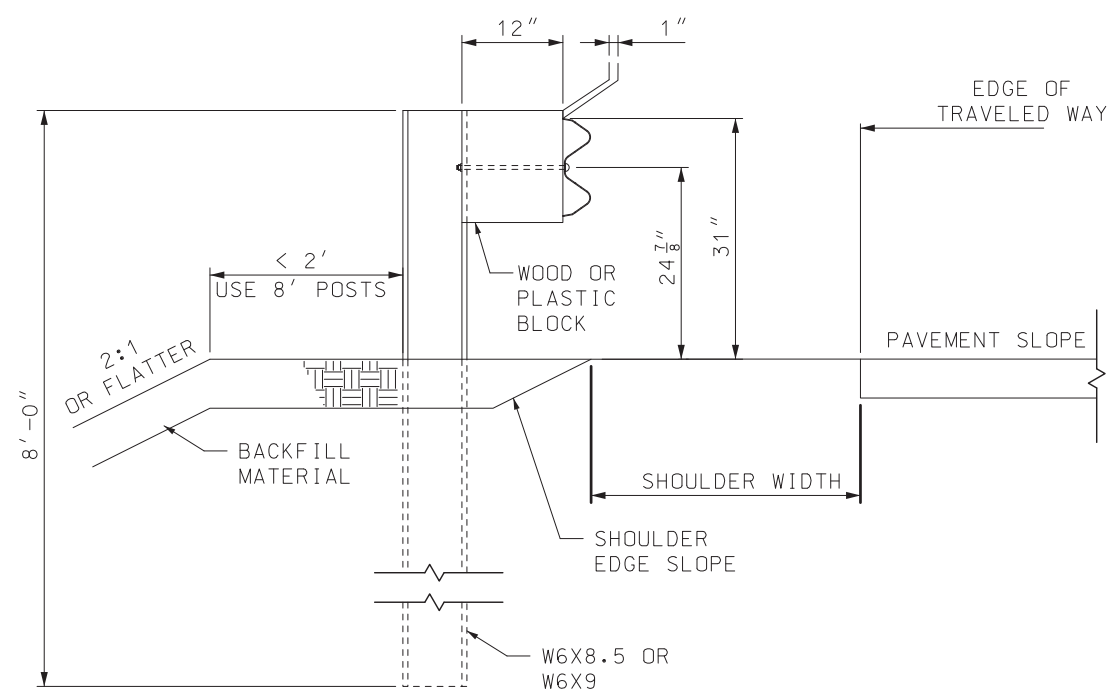
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

MIDWEST GUARDRAIL SYSTEM
(MGS)
SPECIAL INSTALLATIONS

DATE EFFECTIVE: 01/01/2019
DATE PREPARED: 10/17/2018

606.50D

SHEET NO.
5 OF 8



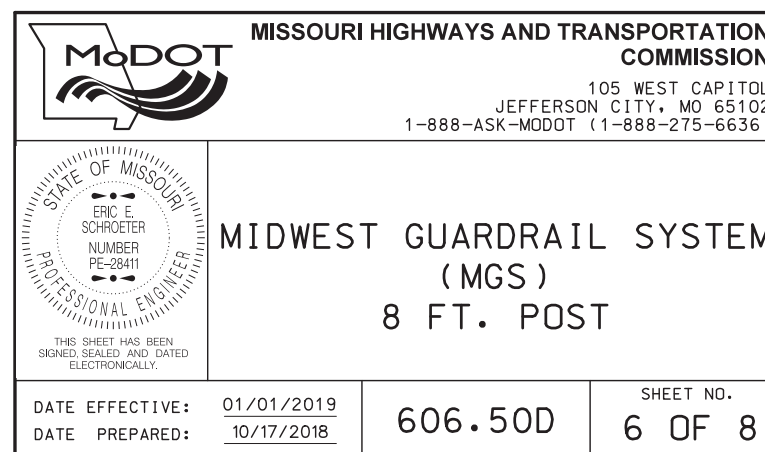
(1) 3'-6" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 8' POSTS ADJACENT TO A 2:1 SLOPE.

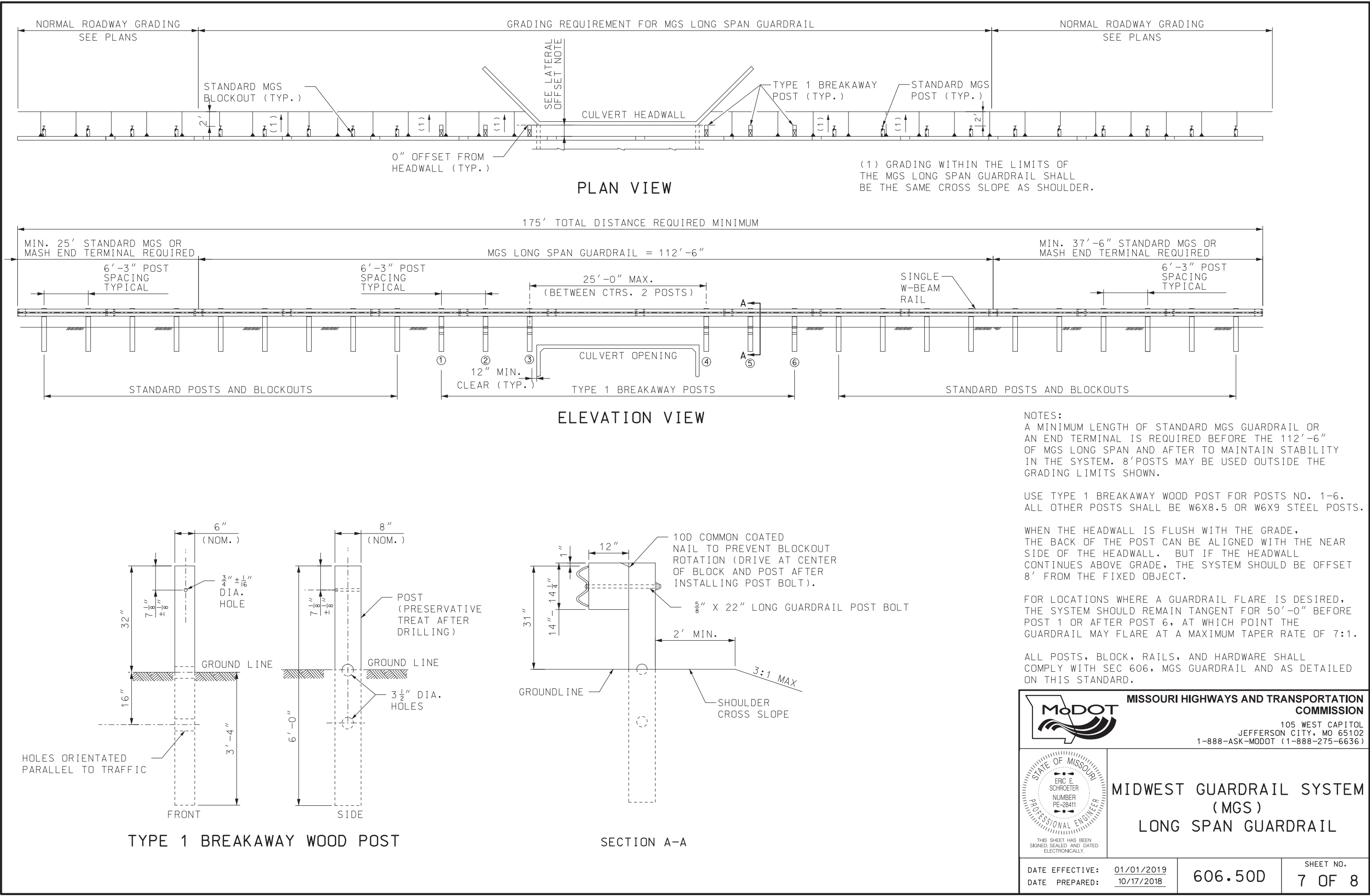
(2) WHERE THERE IS NOT SUFFICIENT EMBANKMENT BEYOND THE SHOULDER TO PLACE THE GUARDRAIL POST, THE POSTS MAY BE PLACED A MAXIMUM OF 12" BEYOND THE SLOPE BREAK POINT OF A 2:1 OR FLATTER SLOPE.

GENERAL NOTES:

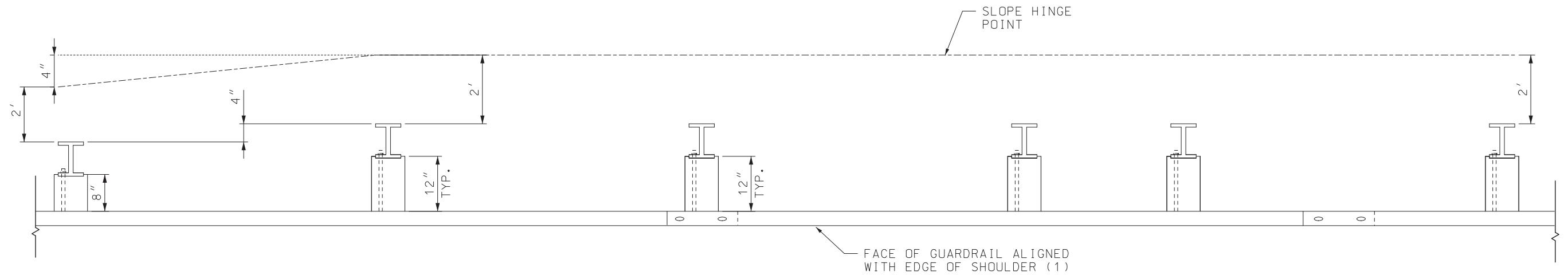
SEE STD. PLAN 606.81 FOR SITE GRADING REQUIREMENTS FOR CRASHWORTHY END
TERMINALS.

8 FOOT POSTS SHALL BE USED WHEN LESS THAN 2 FEET OF EMBANKMENT IS PRESENT BETWEEN THE BACK OF THE GUARDRAIL POST AND THE SLOPE BREAK POINT. THE SUBSTITUTION OF 8 FOOT POSTS IN LIEU OF REQUIRED GRADING, TO CONSTRUCT LESS THAN THE DESIGNED TYPICAL SECTION, SHALL NOT BE ALLOWED.

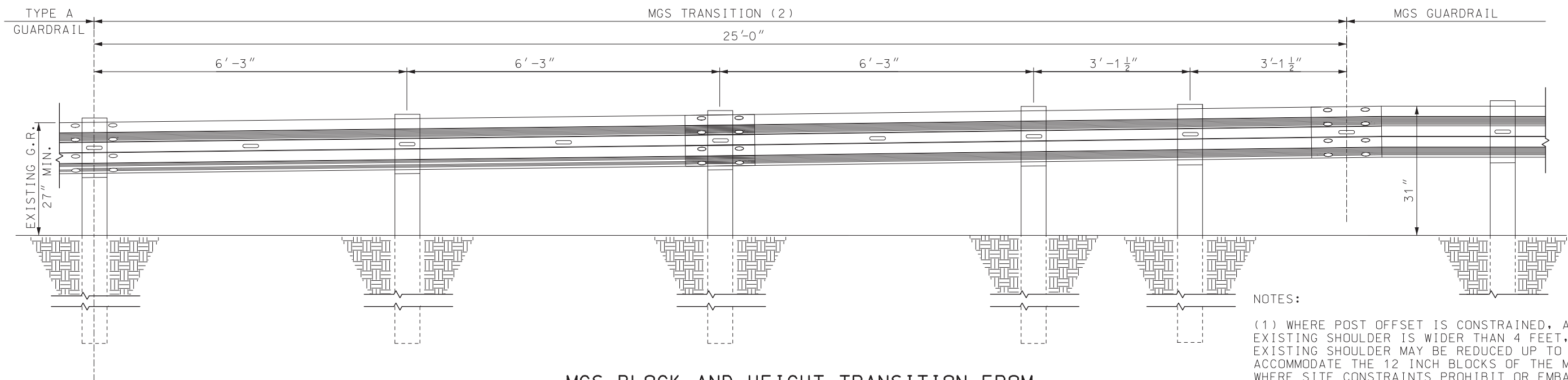




IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN VIEW

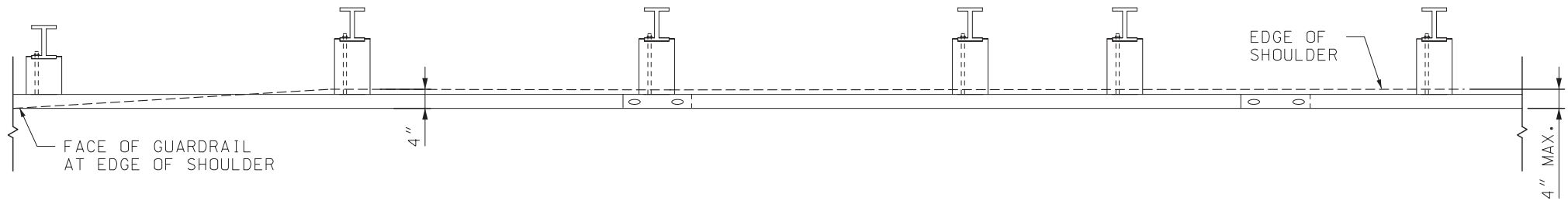


MGS BLOCK AND HEIGHT TRANSITION FROM
TYPE A GUARDRAIL TO MGS GUARDRAIL


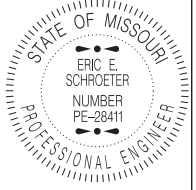
NOTES:

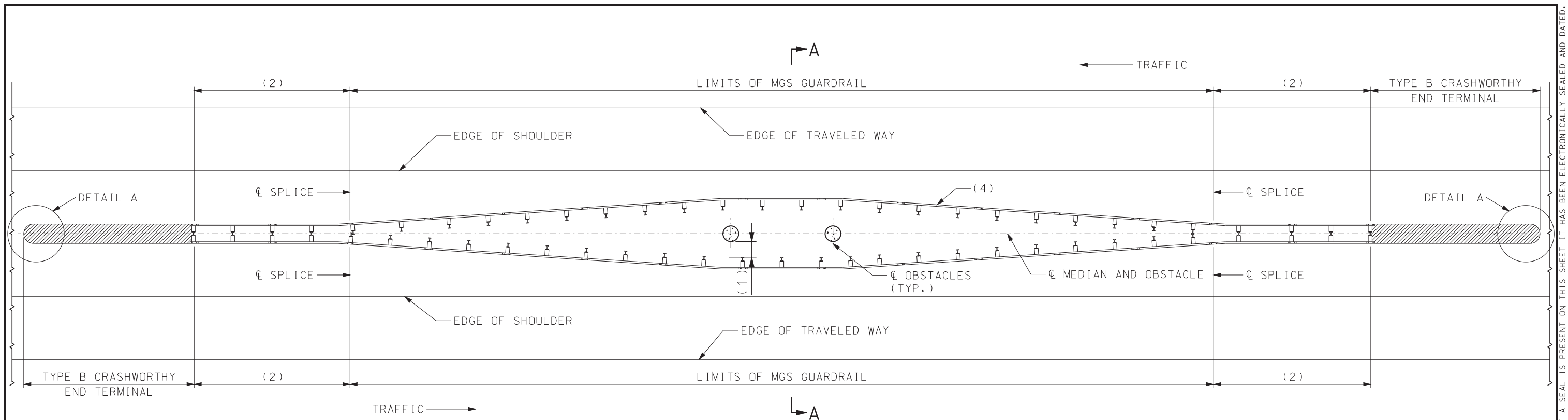
(1) WHERE POST OFFSET IS CONSTRAINED, AND WHEN THE EXISTING SHOULDER IS WIDER THAN 4 FEET, THE EXISTING SHOULDER MAY BE REDUCED UP TO 4 INCHES TO ACCOMMODATE THE 12 INCH BLOCKS OF THE MGS GUARDRAIL. WHERE SITE CONSTRAINTS PROHIBIT OR EMBANKMENT CANNOT BE CONSTRUCTED TO PROVIDE A MINIMUM OF 2 FEET BETWEEN THE BACK OF THE GUARDRAIL POST AND SLOPE BREAK POINT, 8 FOOT POSTS SHALL BE USED (SEE SHEET 6 OF 8). THE SUBSTITUTION OF 8 FOOT POSTS FOR REQUIRED GRADING SHALL NOT BE ALLOWED.

(2) MGS TRANSITION FROM TYPE A GUARDRAIL SHALL BE COMPLETED OUTSIDE THE 50' MGS END TERMINAL LIMITS.



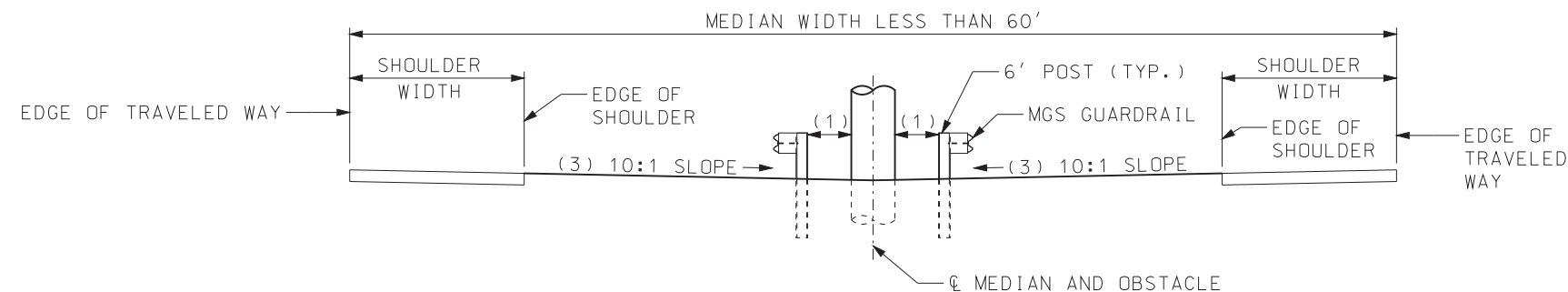
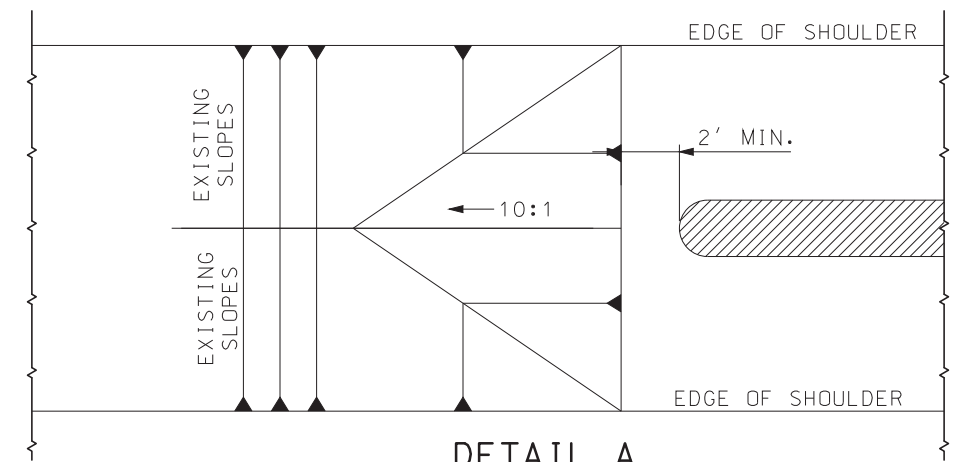
ALTERNATE PLAN VIEW - ALIGNMENT TAPER
SEE NOTE (1)

| | | |
|--|---|----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) BLOCK AND HEIGHT TRANSITION | |
| DATE EFFECTIVE: 01/01/2019 DATE PREPARED: 10/17/2018 | 606.50D | SHEET NO. 8 OF 8 |



PIER AT CL MEDIAN

- (1) 3'-0" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACING IS PREFERRED
2'-0" MINIMUM CLEARANCE USE 3'-1 1/2" POST SPACING
1'-6" MINIMUM CLEARANCE USE 1'-6 3/4" POST SPACING
SEE STD. PLANS 606.50 FOR POST SPACING DETAILS.
- (2) TRANSITION DOUBLE FACED GUARDRAIL HEIGHT AND WIDTH IF NEEDED FOR TYPE B CRASHWORTHY END TERMINAL PER MANUFACTURER'S REQUIREMENTS. SEE STD. PLANS 606.50 FOR HEIGHT TRANSITION DETAILS.
- (3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.
- (4) 15:1 FLARE RATE OR AS RECOMMENDED BY TABLE 5-9 OF THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE".

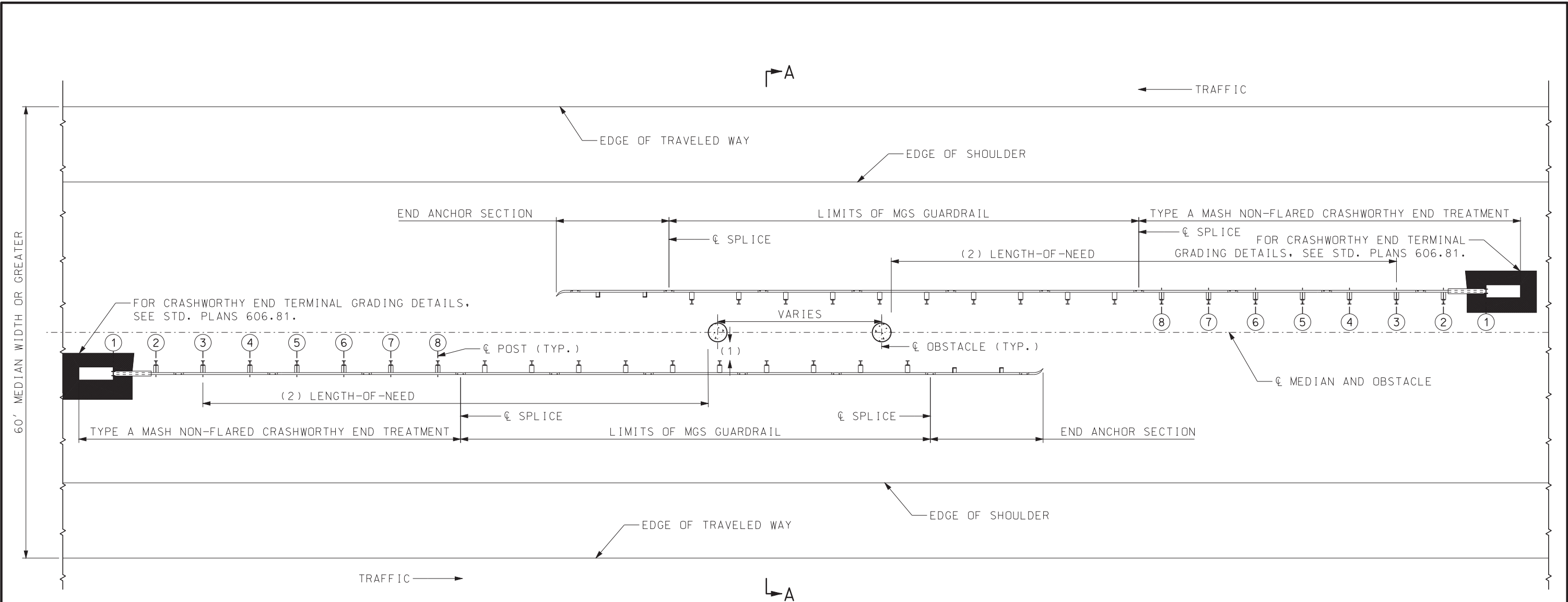


SECTION A-A

GENERAL NOTE:

TYPE B CRASHWORTHY END TERMINAL SHALL BE MGS COMPATIBLE, LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MGS GUARDRAIL MEDIAN PIER PROTECTION MEDIAN LESS THAN 60' |
| DATE EFFECTIVE: 10/01/2017 DATE PREPARED: 8/8/2017 | 606.51 |
| SHEET NO. 1 OF 2 | |

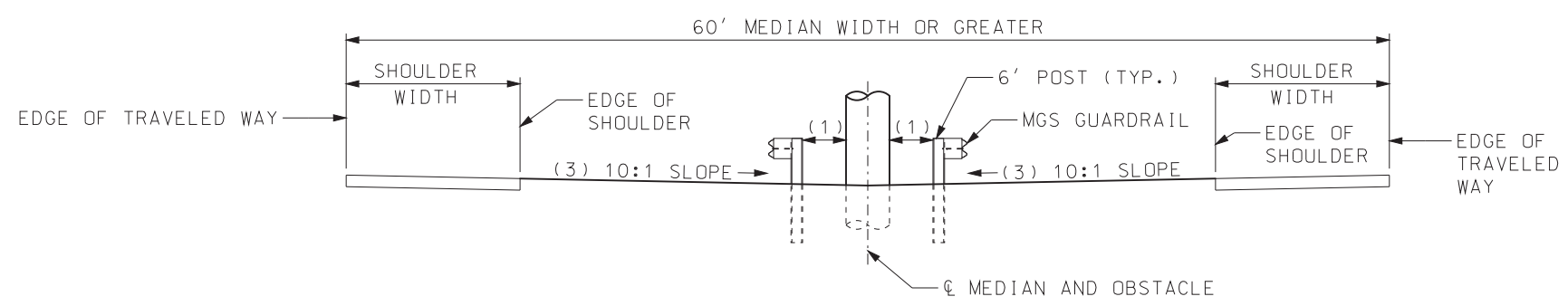


PIER AT CL MEDIAN


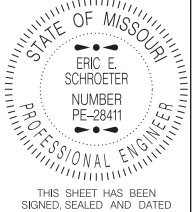
- (1) 3'-0" MINIMUM CLEARANCE TO THE FACE OF OBSTACLE WITH 6'-3" POST SPACING IS PREFERRED
2'-0" MINIMUM CLEARANCE USE 3'-11#2" POST SPACING
1'-6" MINIMUM CLEARANCE USE 1'-63#4" POST SPACING
SEE STD. PLANS 606.50 FOR POST SPACING DETAILS.
- (2) FOR LENGTH-OF-NEED, SEE THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE 5.6.4 LENGTH-OF-NEED".
- (3) CONTINUE 10:1 SLOPE TO OBSTACLE OR A MINIMUM OF 2' PAST THE BACK OF THE GUARDRAIL POST.

GENERAL NOTE:
 MEDIAN WIDTHS GREATER THAN 60' THAT THE PIER OBSTACLES ARE BEYOND THE CLEAR-ZONE DO NOT REQUIRE MEDIAN PIER PROTECTION. FOR CLEAR-ZONE DISTANCES, SEE THE LATEST VERSION OF THE "ROADSIDE DESIGN GUIDE 3.1 THE CLEAR-ZONE CONCEPT".

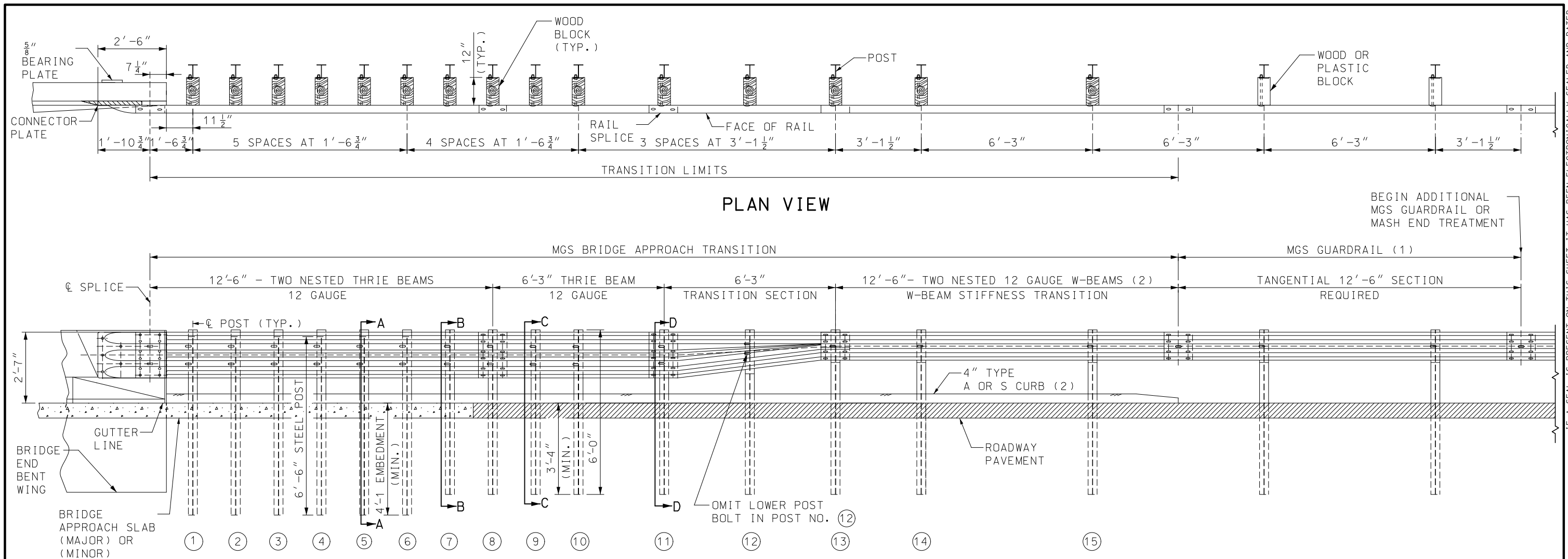
TYPE A NON-FLARED CRASHWORTHY END TERMINAL SHALL BE THE LATEST VERSION AND SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.



SECTION A-A

| | | |
|--|--|---------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | MGS GUARDRAIL MEDIAN PIER PROTECTION 60' MEDIAN OR GREATER | |
| | DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | 606.51 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



GENERAL NOTES:

MGS GUARDRAIL SHALL BE TANGENTIAL WITH BRIDGE APPROACH TRANSITION FOR 12'-6" BEYOND THE TWO NESTED W-BEAM STIFFNESS TRANSITION AND 25'-0" BEYOND THRIE BEAM TRANSITION SECTION.

AT THE CONTRACTORS OPTION, A SINGLE 18'-9" PIECE OF THRIE BEAM MAY BE SUBSTITUTED FOR ONE OF THE 12'-6" PANELS AND THE 6'-3" SECTION AS SHOWN.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE $\frac{5}{8}$ " BUTTON-HEAD OVAL SHOULDER BOLTS WITH HEX NUTS AT ALL SLOTS (THICKNESS OF HEX NUTS = $\frac{3}{8}$ " MIN.).

THE BEARING PLATE SHALL BE FABRICATED FROM GRADE A36 STEEL AND GALVANIZED.


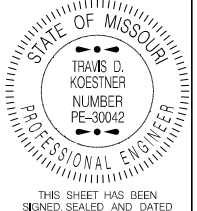
ALL LAP SPLICES, INCLUDING END SHOES, SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

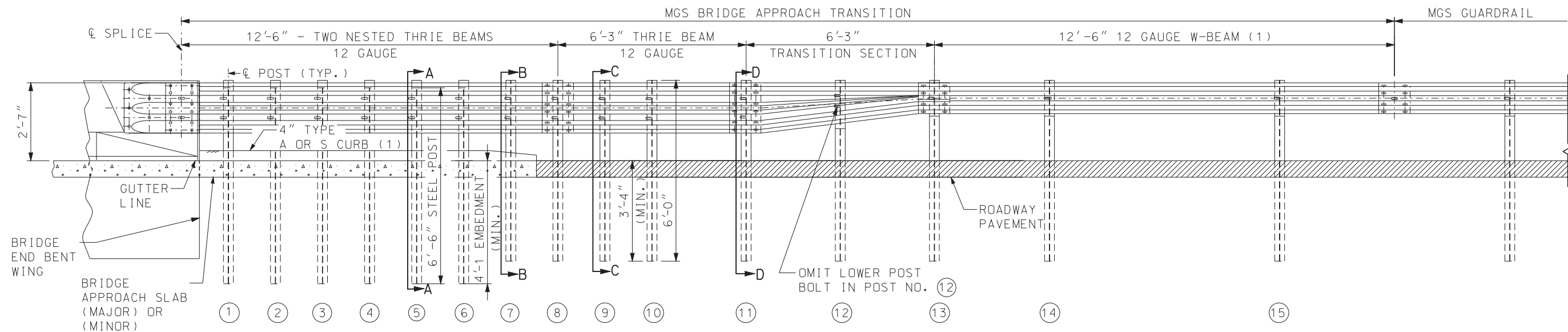
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE APPROACH TRANSITION (EXTENDED CURB), COMPLETE IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

BRIDGE APPROACH TRANSITION (EXTENDED CURB)(2)

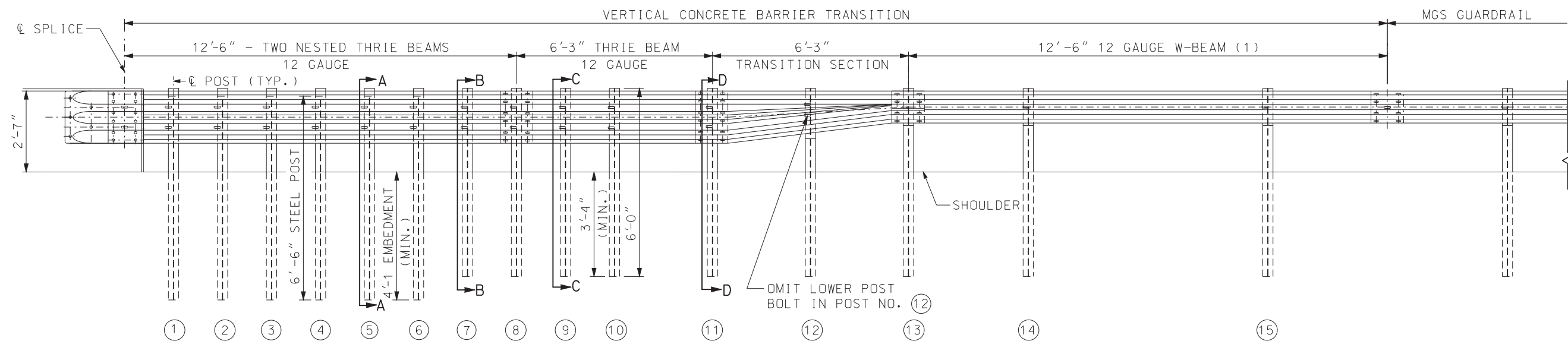
THE CONTRACTOR MAY, AT THEIR OPTION, FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 111.

- (1) PLACE THE FIRST POST OF THE MGS 6'-3" PAST THE LAST POST OF THE BRIDGE APPROACH TRANSITION TO KEEP POSTS OFFSET FROM THE RAIL SPLICES.
- (2) WHERE CURB EXTENDS UPSTREAM OF POST NO. (11) FOR DRAINAGE PURPOSES, A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12 GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION (UPSTREAM OF POST NO. (13)). THE CURB SHALL BE EXTENDED TO THE END OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN 609.40 FOR DETAILS. WHEN CURBS DO NOT EXTEND UPSTREAM OF POST NO. (11), PAY FOR A BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB). FOR DETAILS OF BRIDGE APPROACH TRANSITION (REGULAR CURB/NO CURB), SEE SHEET 2 OF 6.

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS |
| DATE EFFECTIVE: 04/01/2020 DATE PREPARED: 1/14/2020 | 606.60B |
| SHEET NO. 1 OF 6 | |



BRIDGE APPROACH TRANSITION (WITH REGULAR LENGTH CURB OR NO CURB)(1)


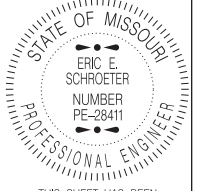


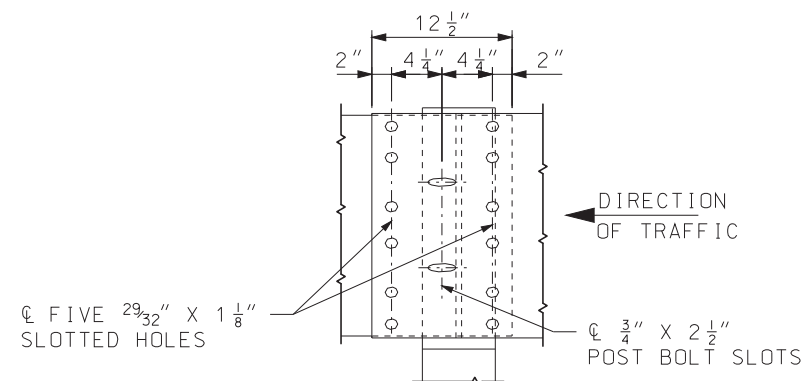
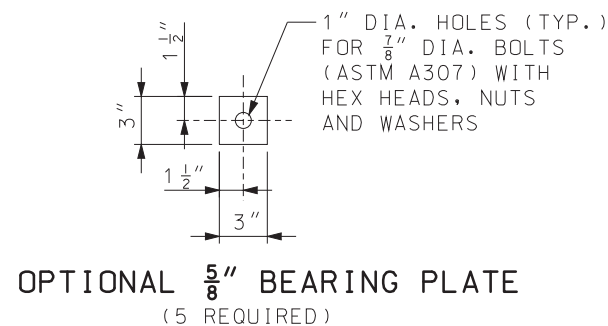
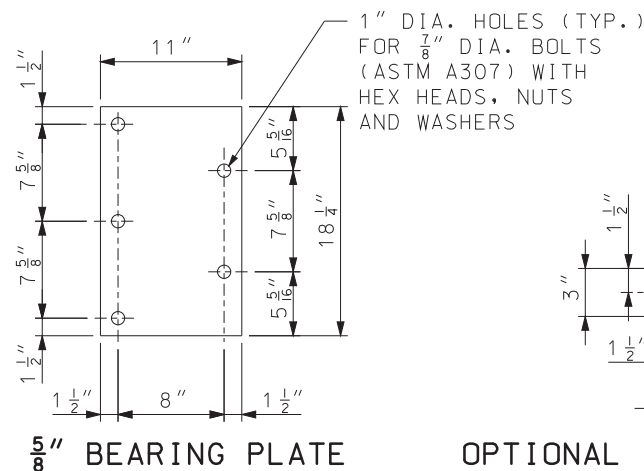
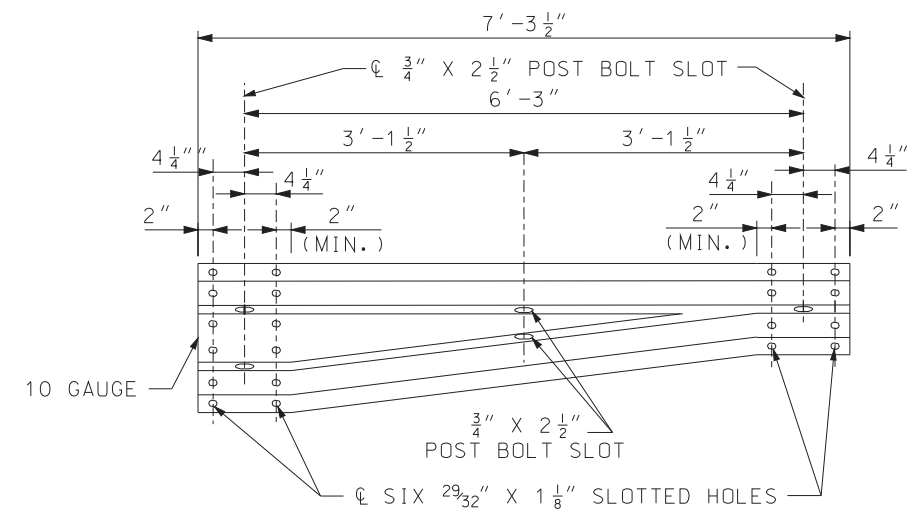
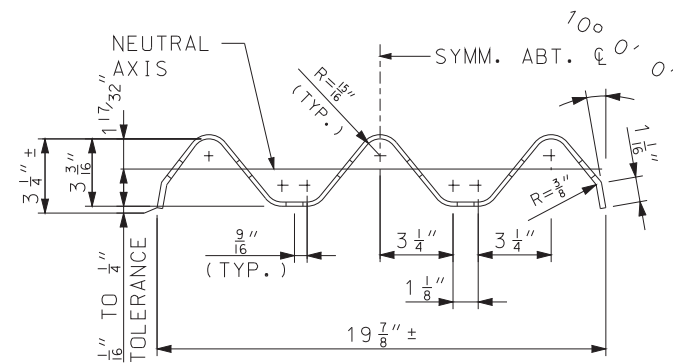
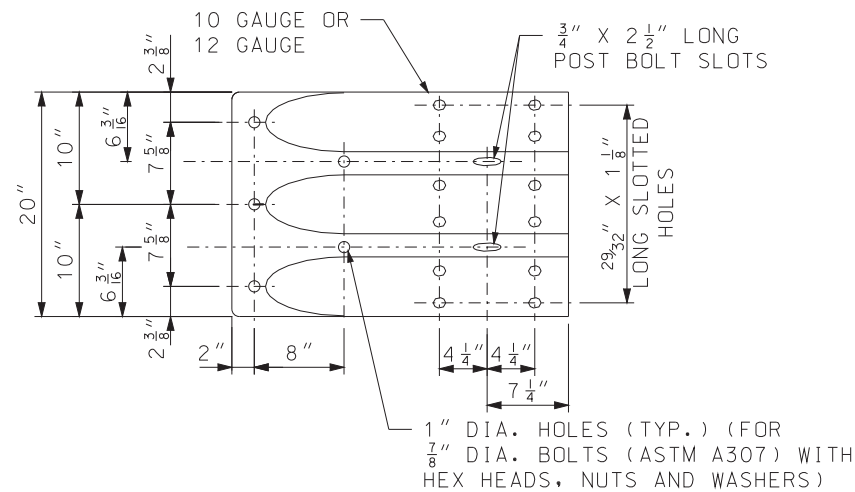
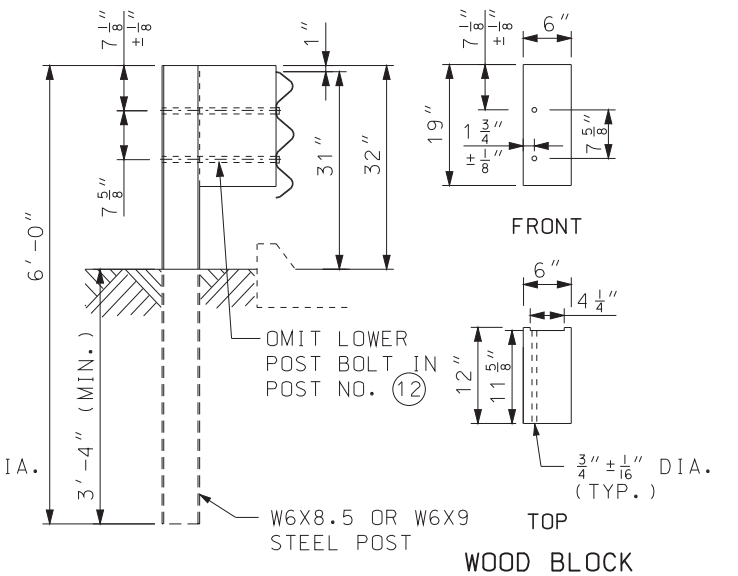
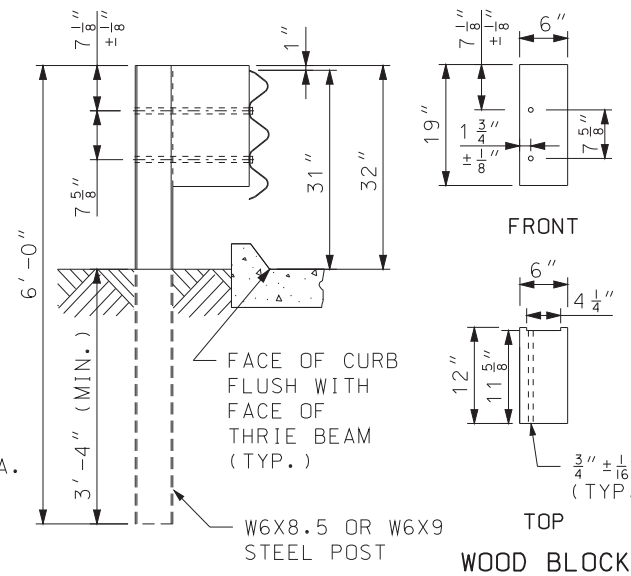
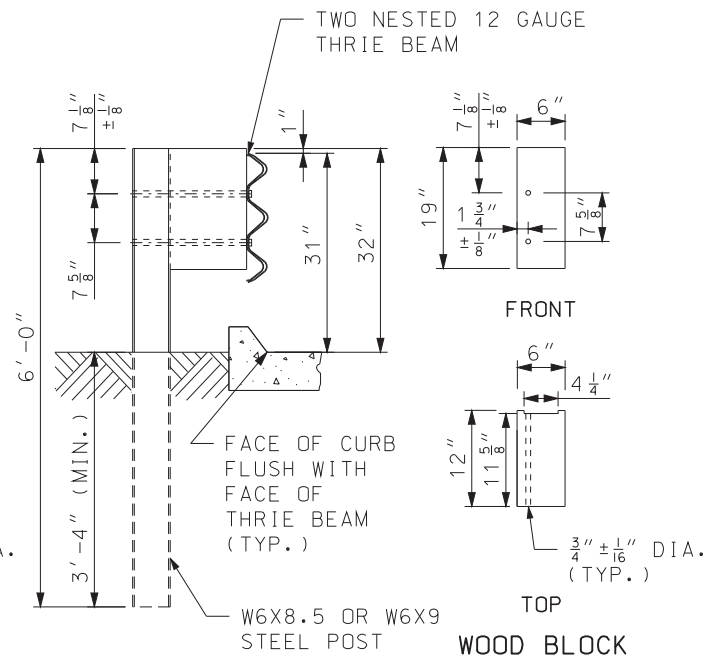
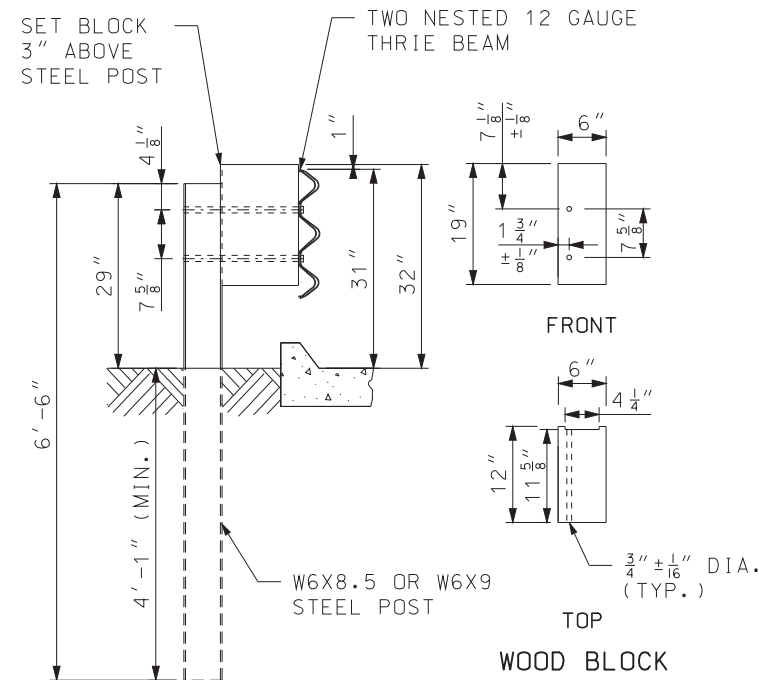
VERTICAL CONCRETE BARRIER TRANSITION (REGULAR LENGTH CURB OR NO CURB)(1)
(VIEW SHOWN WITHOUT CURB)


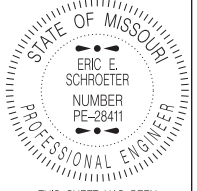
GENERAL NOTES:
SEE SHEET 1 FOR ADDITIONAL NOTES NOT INCLUDED ON THIS SHEET.

THE COST OF FURNISHING, FABRICATING AND INSTALLING
BRIDGE APPROACH TRANSITION (REGULAR/NO CURB), COMPLETE
IN PLACE, WILL BE PAID FOR AT THE CONTRACT UNIT
PRICE PER EACH.

(1) WHERE CURB EXTENDS UPSTREAM OF POST NO. (11) FOR DRAINAGE PURPOSES,
A STIFFNESS TRANSITION CONSISTING OF AN EXTRA 12'-6" BEAM OF 12
GAUGE W-BEAM MUST BE NESTED PRIOR TO THE TRANSITION SECTION
(UPSTREAM OF POST NO. (13)). THE CURB SHALL BE EXTENDED TO THE END
OF THE 12'-6" 12 GAUGE W-BEAM STIFFNESS TRANSITION SEE STD. PLAN
609.40 FOR DETAILS. IF CURB EXTENDS BEYOND POST NO. (11), PAY FOR
A BRIDGE APPROACH TRANSITION (EXTENDED CURB).

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.60B |
| SHEET NO. 2 OF 6 | |



| | | |
|--|---------------------------------------|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) | |
| | VERTICAL BARRIER TRANSITIONS | |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.60B | SHEET NO. 3 OF 6 |

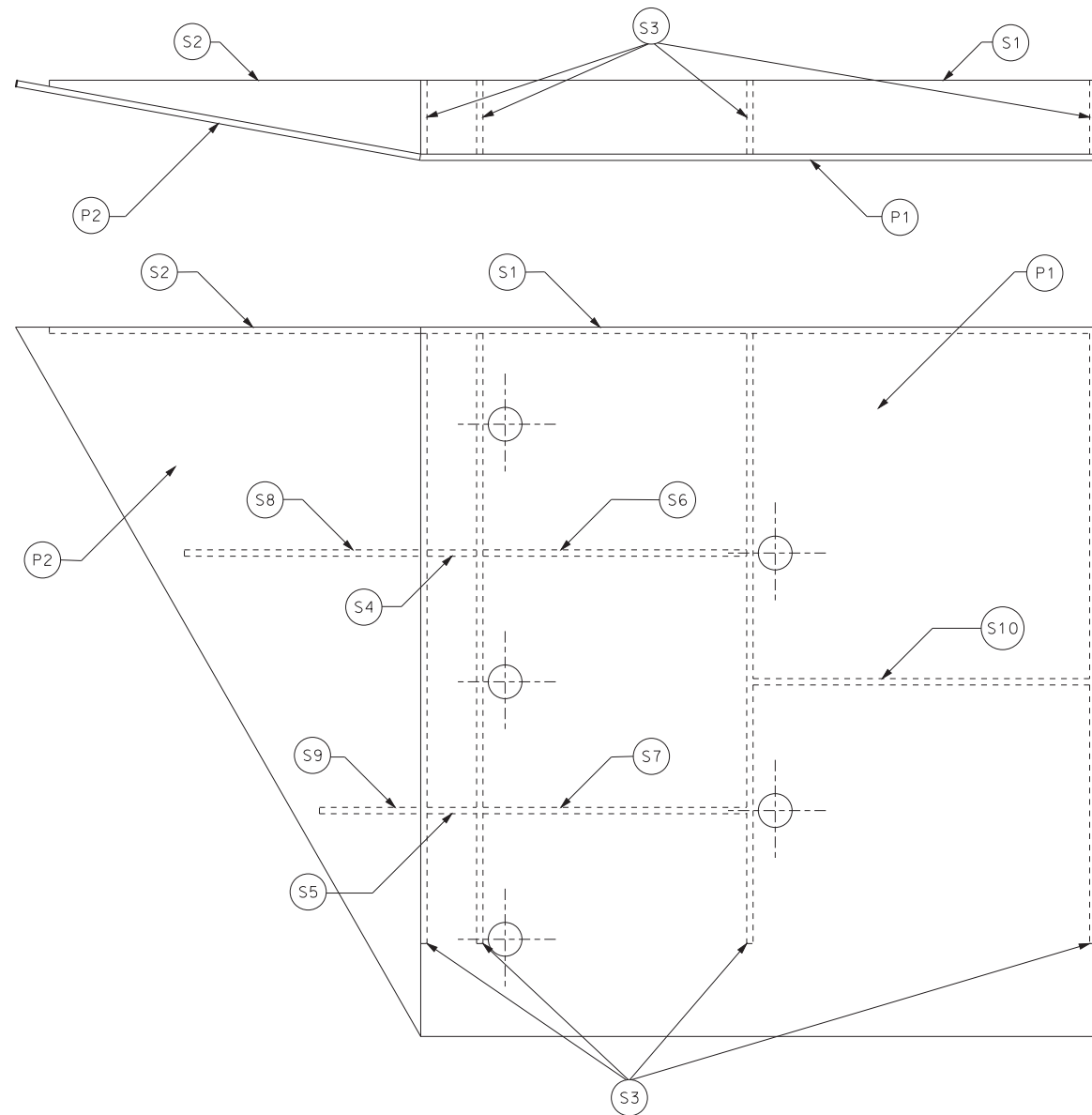
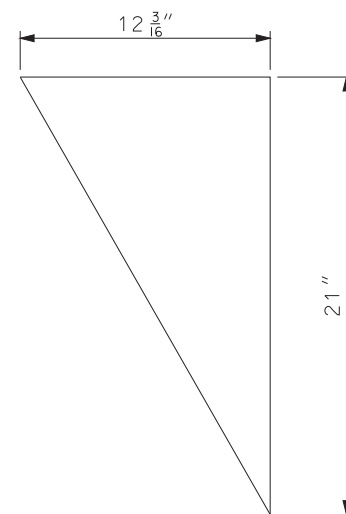
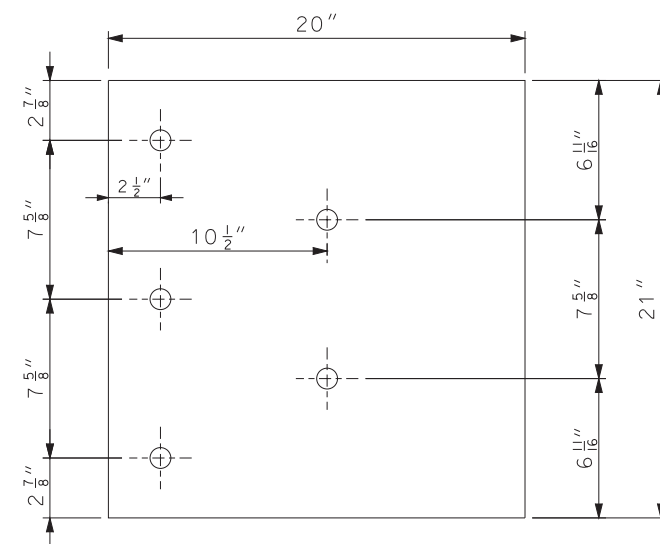


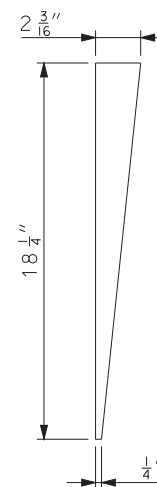
PLATE AND STIFFENER IDENTIFICATION



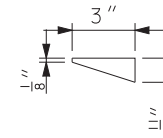
(P2) COVER PLATE #2



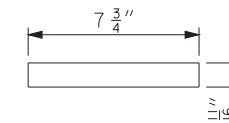
(P1) COVER PLATE #1



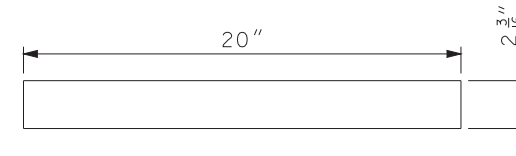
(S3) STIFFENER #3: 4 EACH



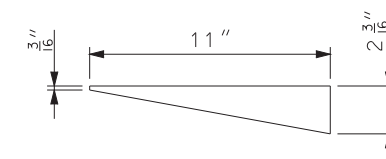
(S9) STIFFENER #9: 1 EACH



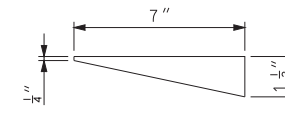
(S7) STIFFENER #7: 1 EACH



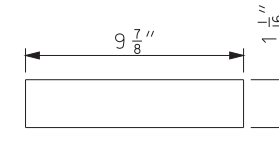
(S1) STIFFENER #1: 1 EACH



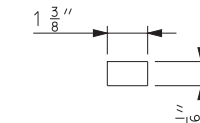
(S2) STIFFENER #2: 1 EACH



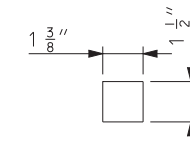
(S8) STIFFENER #8: 1 EACH



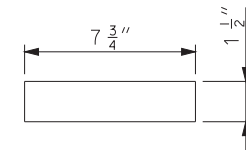
(S10) STIFFENER #10: 1 EACH




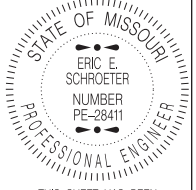
(S5) STIFFENER #5: 1 EACH



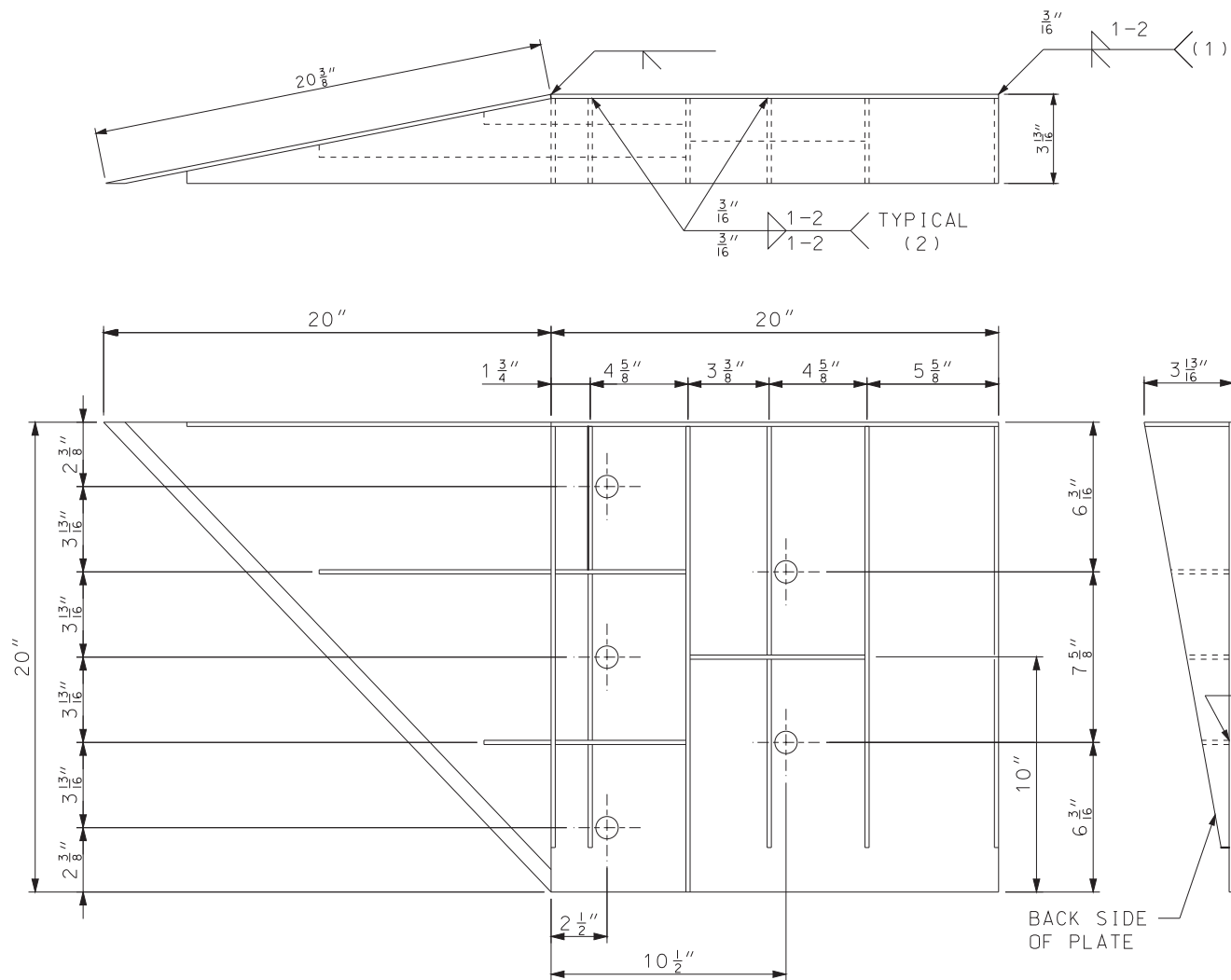
(S4) STIFFENER #4: 1 EACH



(S6) STIFFENER #6: 1 EACH

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS (CONNECTOR PLATE DETAIL) | | |
| | DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.60B | SHEET NO. 4 OF 6 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



WELDING INSTRUCTION (VIEWED FROM BACK SIDE OF PLATE)

- (1) STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- (2) STEFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:
 $\frac{3}{16}$ " FILLET WELD BY 1" LONG SPACED AT 2".

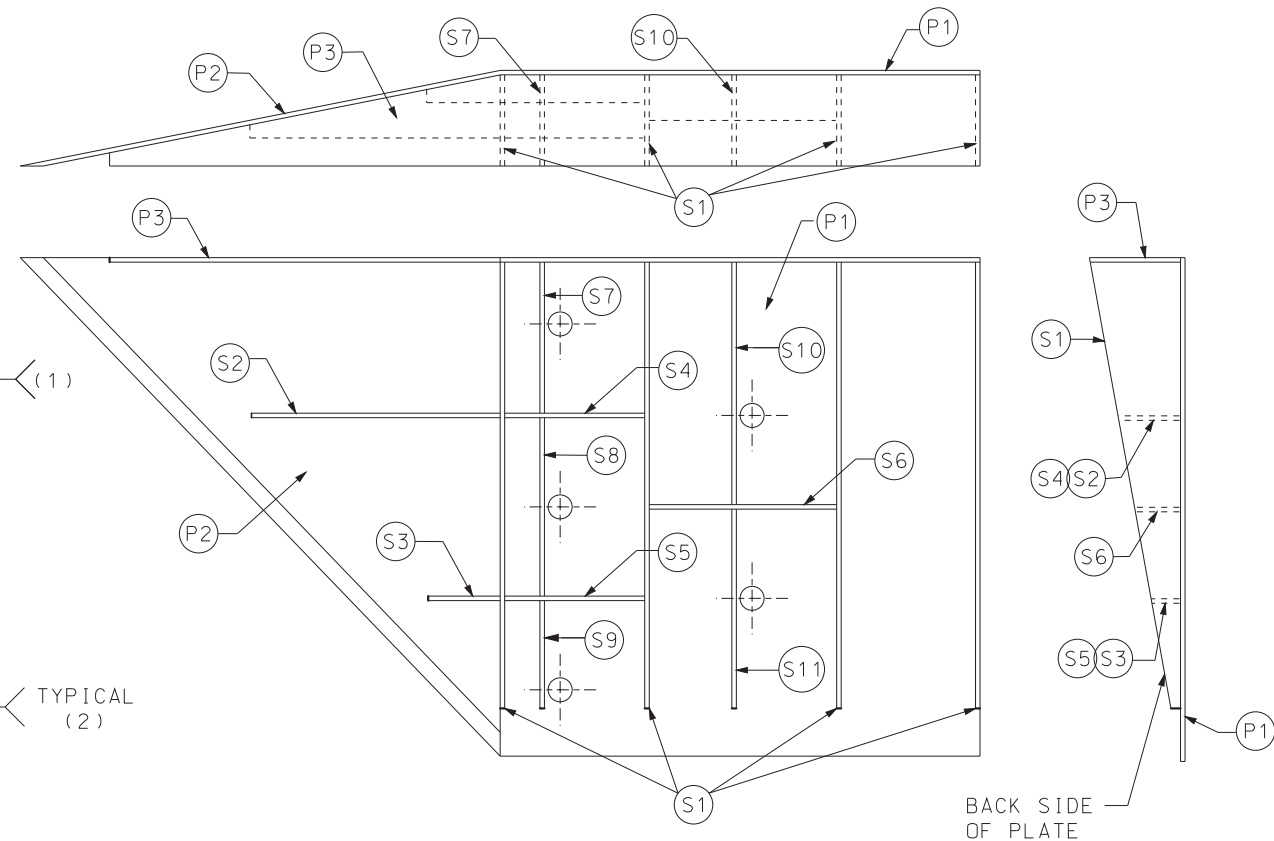
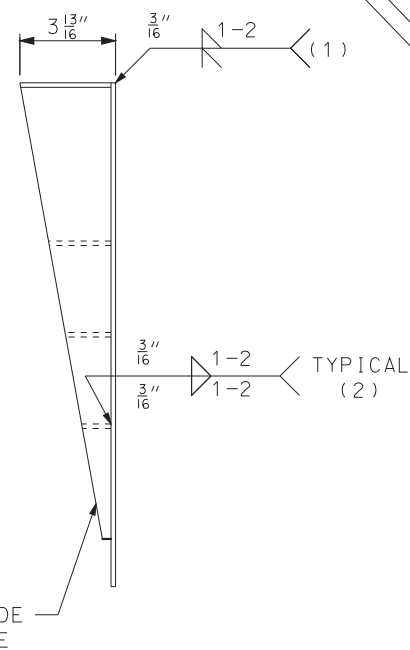


PLATE AND STIFFENER IDENTIFICATION (VIEWED FROM BACK SIDE OF PLATE)

| CONNECTOR PLATE DIMENSION (PER ASSEMBLY) | | | | |
|---|----------|-------|---|------------------|
| PLATE | QUANTITY | SHAPE | SIZE (A x B x C x D) | THICKNESS |
| P1 | 1 | | 20" x 20" | $\frac{3}{16}$ " |
| P2 | 1 | | 20" x 20" x 28 $\frac{3}{16}$ " | $\frac{3}{16}$ " |
| P3 | 1 | | 39" x 3 $\frac{5}{8}$ " x 20" x 19 $\frac{5}{16}$ " | $\frac{3}{16}$ " |
| S1 | 4 | | 18 $\frac{7}{16}$ " x 3 $\frac{5}{8}$ " x 18 $\frac{3}{4}$ " | $\frac{1}{4}$ " |
| S2 | 1 | | 10 $\frac{1}{4}$ " x 2 $\frac{7}{16}$ " x 10 $\frac{3}{8}$ " x $\frac{1}{2}$ " | $\frac{1}{4}$ " |
| S3 | 1 | | 3" x 1 $\frac{1}{16}$ " x 3 $\frac{1}{8}$ " x $\frac{1}{2}$ " | $\frac{1}{4}$ " |
| S4 | 1 | | 6 $\frac{1}{8}$ " x 2 $\frac{7}{16}$ " | $\frac{1}{4}$ " |
| S5 | 1 | | 6 $\frac{1}{8}$ " x 1 $\frac{1}{16}$ " | $\frac{1}{4}$ " |
| S6 | 1 | | 7 $\frac{3}{4}$ " x 1 $\frac{3}{4}$ " | $\frac{1}{4}$ " |
| S7 | 1 | | 2 $\frac{3}{16}$ " x 6" x 3 $\frac{5}{8}$ " x 5 $\frac{7}{8}$ " | $\frac{1}{4}$ " |
| S8 | 1 | | 1 $\frac{5}{32}$ " x 7 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " x 7 $\frac{3}{8}$ " | $\frac{1}{4}$ " |
| S9 | 1 | | 6 $\frac{1}{16}$ " x 6 $\frac{3}{16}$ " x 1 $\frac{3}{32}$ " | $\frac{1}{4}$ " |
| S10 | 1 | | 1 $\frac{7}{8}$ " x 9 $\frac{7}{8}$ " x 3 $\frac{5}{8}$ " x 9 $\frac{11}{16}$ " | $\frac{1}{4}$ " |
| S11 | 1 | | 8 $\frac{1}{2}$ " x 8 $\frac{3}{4}$ " x 1 $\frac{13}{16}$ " | $\frac{1}{4}$ " |

GENERAL NOTES:

COVER PLATE PANELS ARE $\frac{3}{16}$ " THICK.

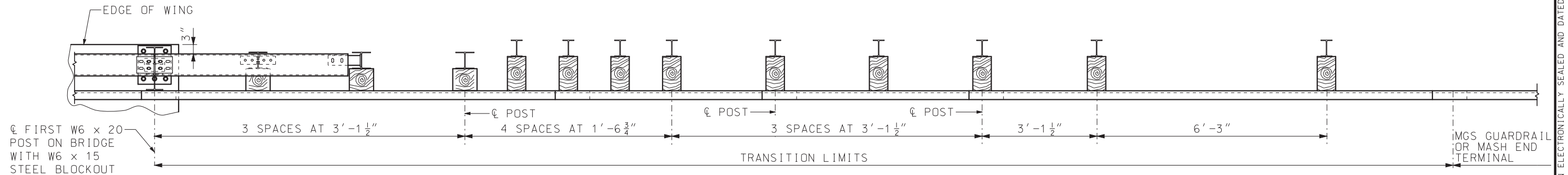
ALL STIFFENERS ARE $\frac{1}{4}$ " THICK.

CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.

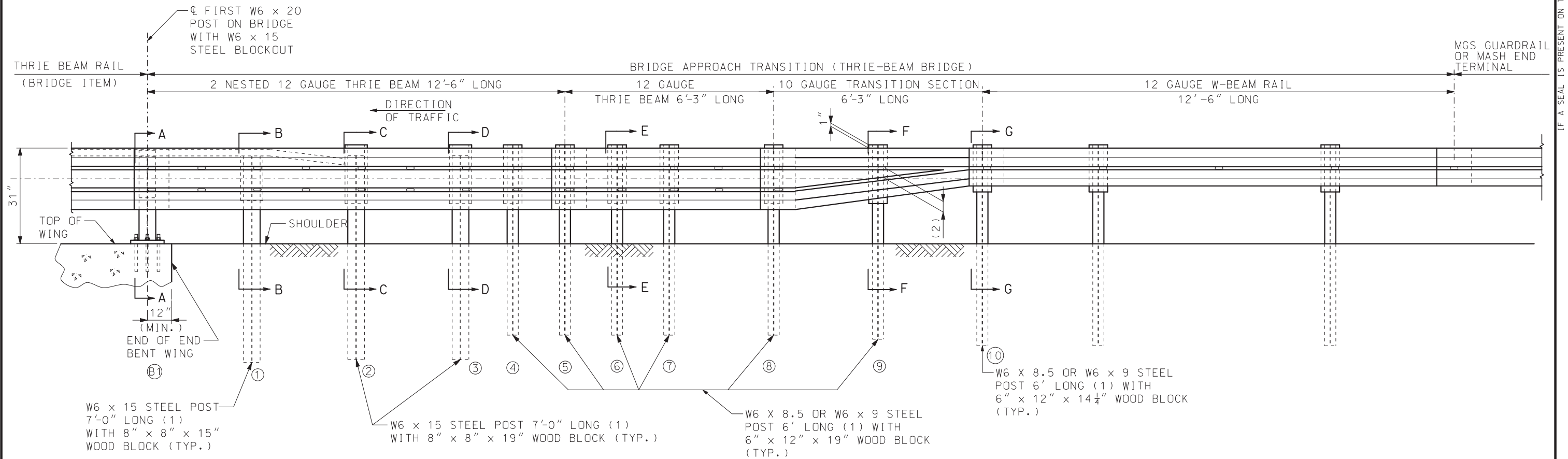
FOR GALVANIZED REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

ALL HOLE DIAMETERS SHALL BE 1".

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| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | MIDWEST GUARDRAIL SYSTEM (MGS) VERTICAL BARRIER TRANSITIONS (CONNECTOR PLATE DETAIL) SINGLE SLOPE BARRIERS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.60B SHEET NO. 6 OF 6 |



PLAN



PART SECTION THROUGH SLAB AT END OF WING


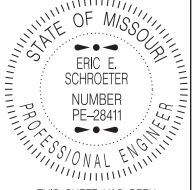
NOTES:

FOR GENERAL NOTES, SEE SHEET 2 OF 5.

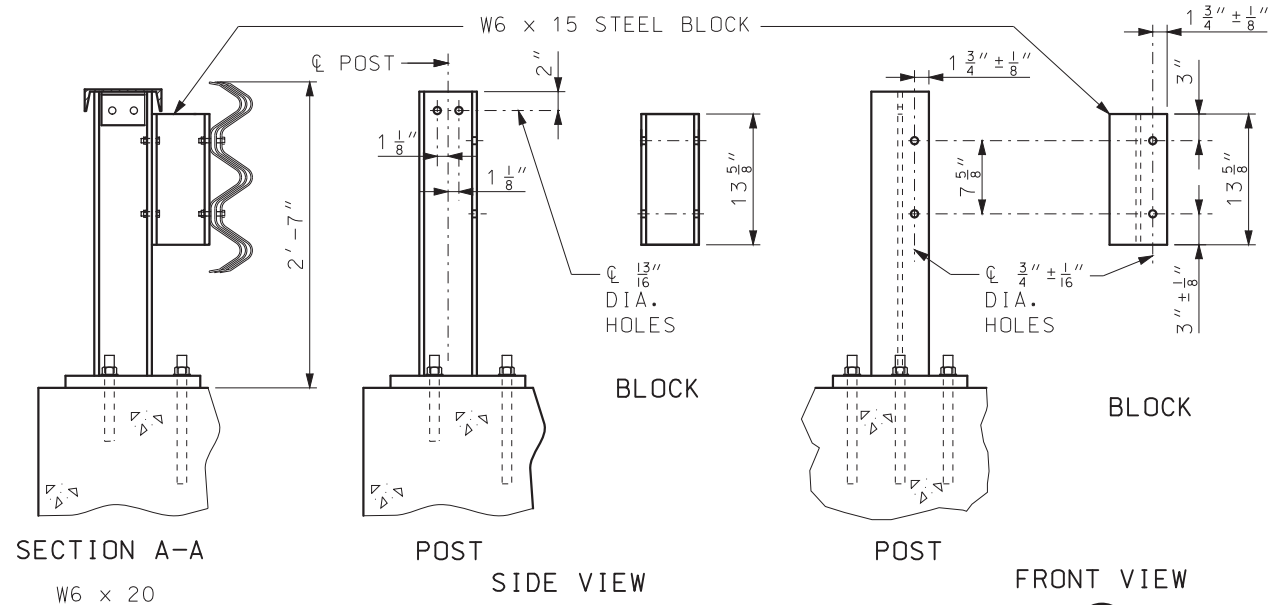
FOR POST DETAILS AND SECTION VIEWS, SEE SHEET 2 AND 3 OF 5.

(1) AT CONTRACTOR'S OPTION, EQUIVALENT SECTIONS MAY BE FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A769 GRADE 36 OR 40. THE SECTIONS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO 111.

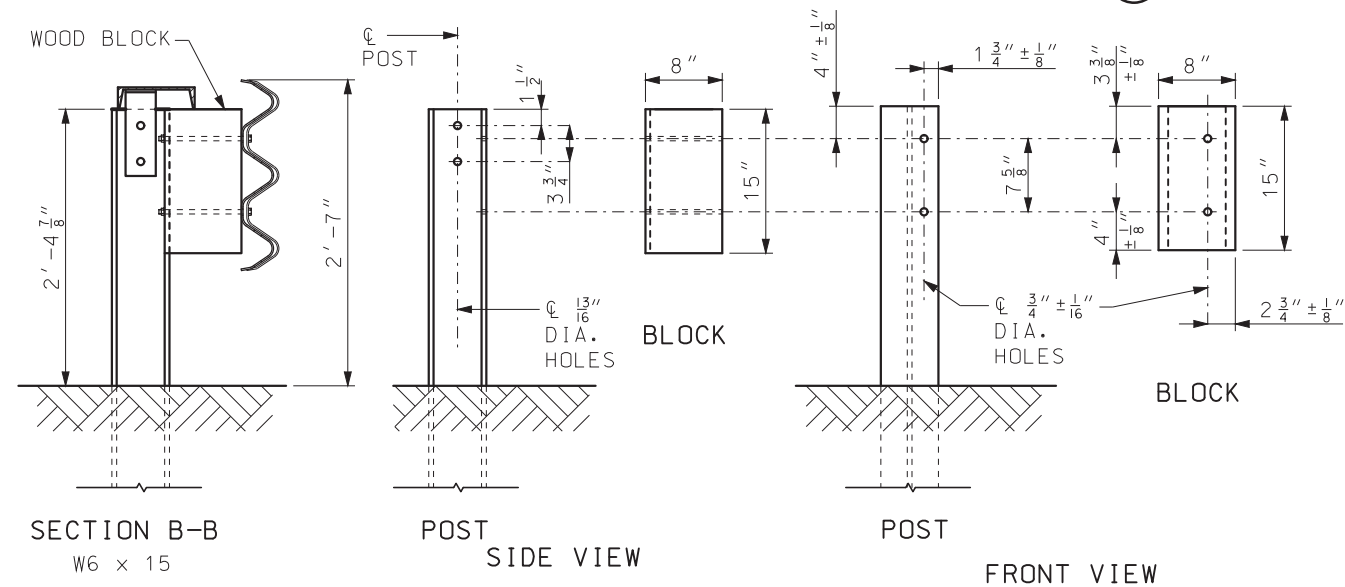
(2) VERIFY BY RAIL TRANSITION PRODUCER.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE) |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.70B |
| SHEET NO. 1 OF 5 | |

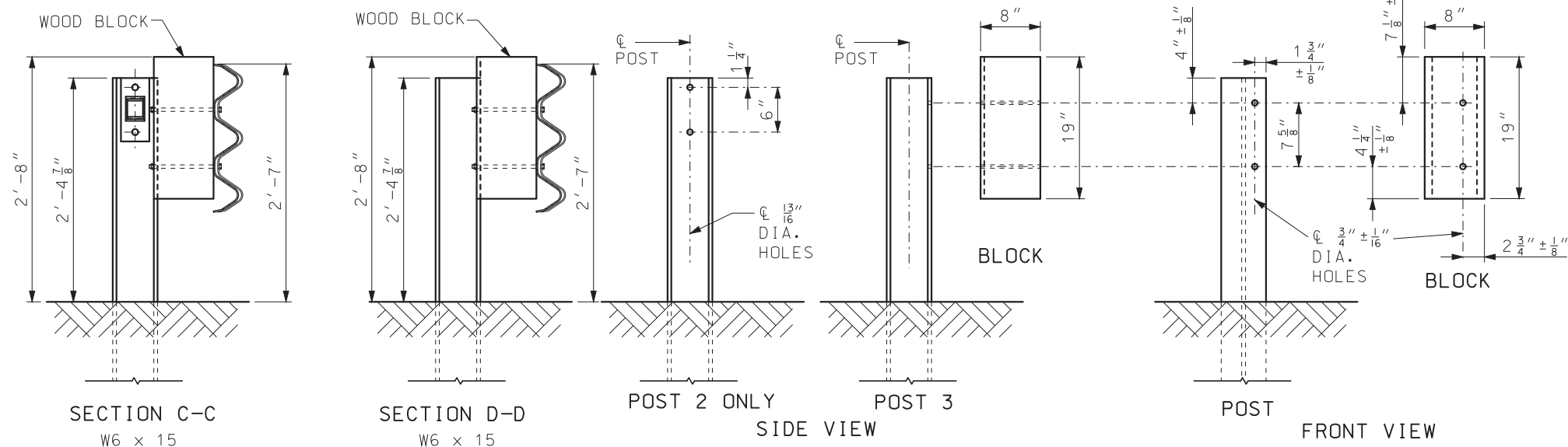
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



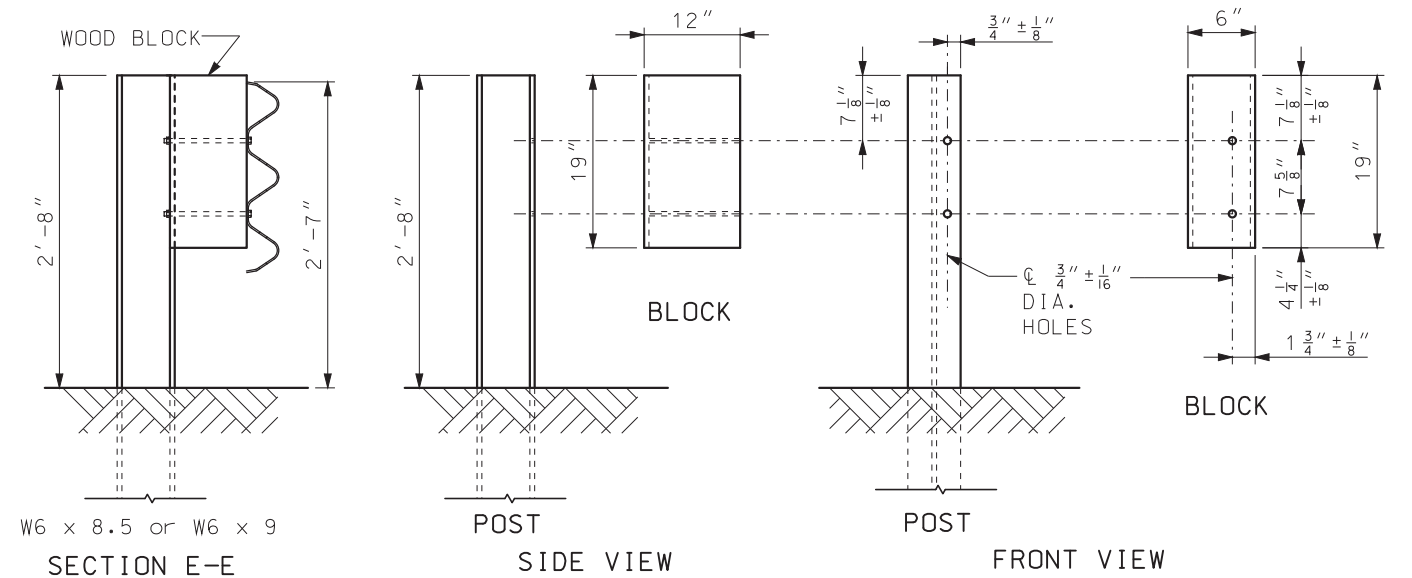
STEEL POST AND STEEL BLOCK (B1)



STEEL POST AND WOOD BLOCK (1)



STEEL POST AND WOOD BLOCK (2) and (3)



STEEL POST AND WOOD BLOCK (4) THROUGH (8)

GENERAL NOTES:

DESIGN BASED UPON MASH TEST LEVEL 3 (TL-3).

FABRICATED STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 36.

FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SEC 1040 OF THE STANDARD SPECIFICATIONS.

RAIL POSTS SHALL BE SET PERPENDICULAR TO THE ROADWAY PROFILE GRADE AND VERTICALLY IN CROSS SECTION.

USE 5/8" BUTTON-HEAD, OVAL SHOULDER BOLTS WITH HEX NUTS (THICKNESS OF HEX NUTS = 3/8" MIN.) AT ALL SLOTS.

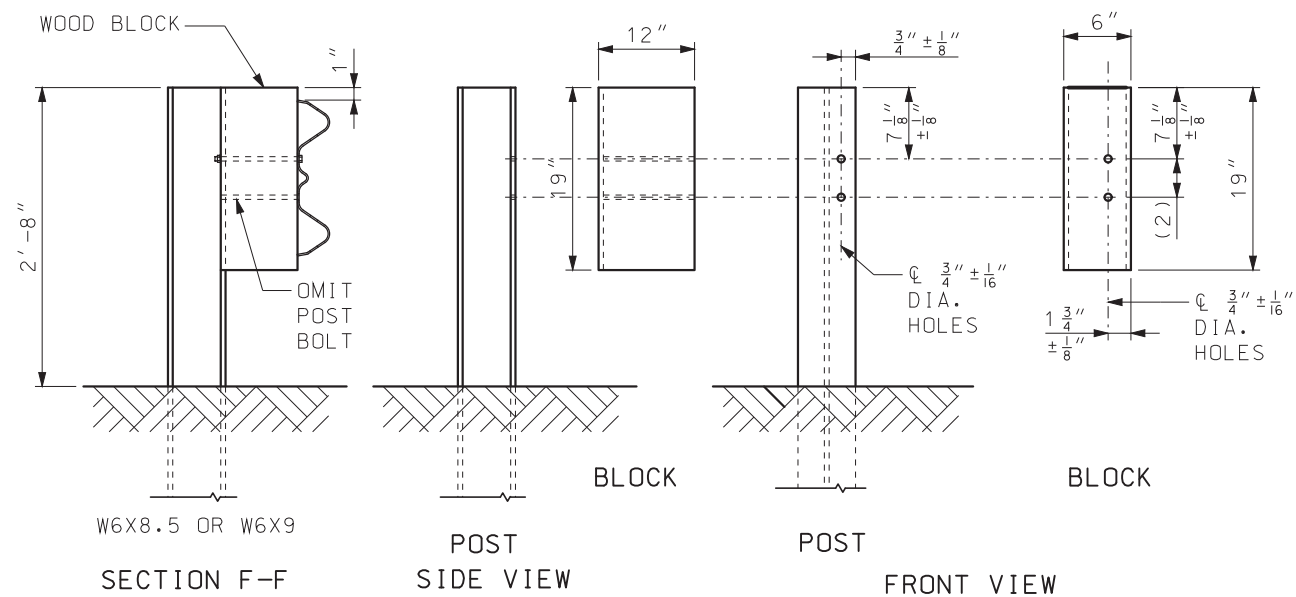
ALL LAP SPLICES SHALL BE MADE IN THE DIRECTION OF TRAFFIC.

THE COST OF FURNISHING, FABRICATING AND INSTALLING TRANSITION SECTION, COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

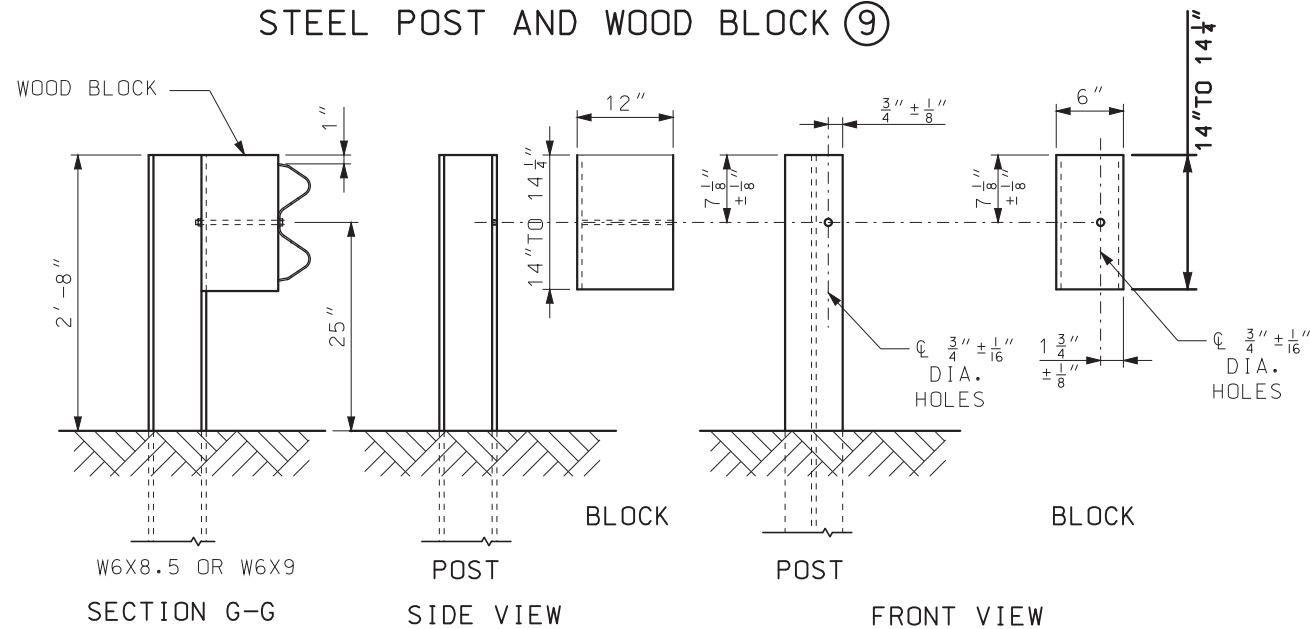
THE COST OF FURNISHING, FABRICATING AND INSTALLING BRIDGE ANCHOR SECTION (THRIE BEAM), COMPLETE-IN-PLACE, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER EACH.

FOR DETAILS NOT SHOWN, SEE BRIDGE THRIE BEAM RAIL SHEET.

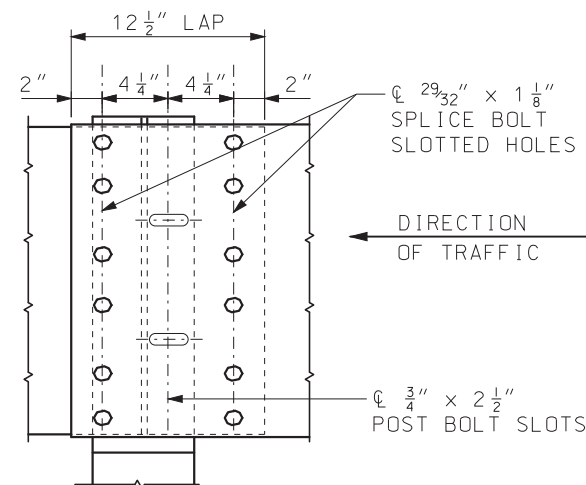
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| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>MIDWEST GUARDRAIL SYSTEM (MGS)</p> <p>BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE)</p> |
| <p>DATE EFFECTIVE: 07/01/2017</p> <p>DATE PREPARED: 5/1/2017</p> | <p>606.70B</p> <p>SHEET NO. 2 OF 5</p> |



STEEL POST AND WOOD BLOCK (9)

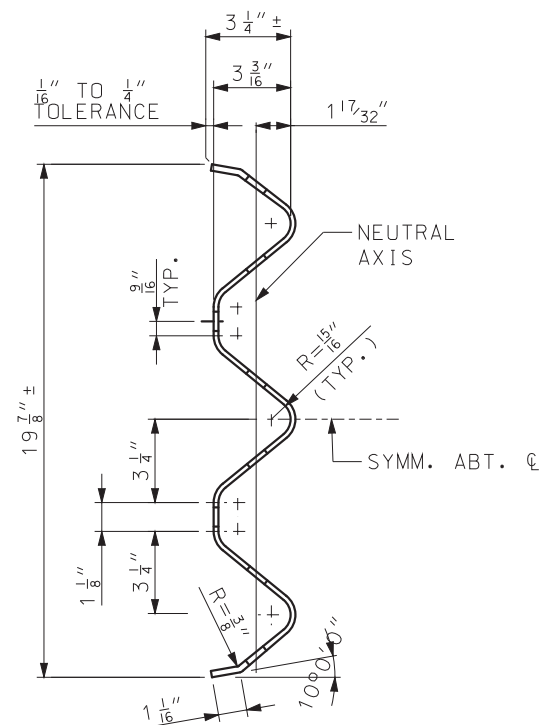


STEEL POST AND WOOD BLOCK (10)



THRIE BEAM RAIL SPLICE AT POST

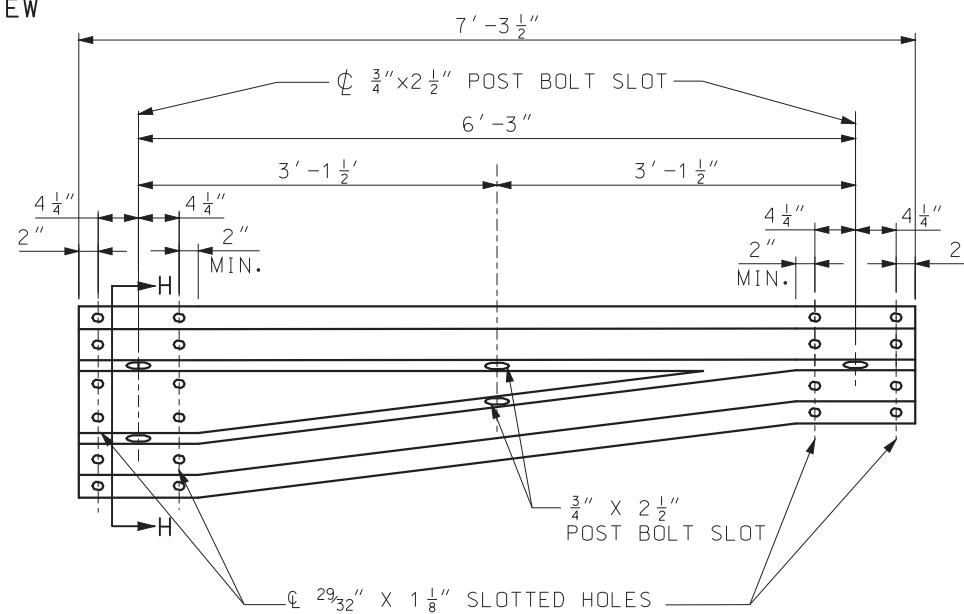
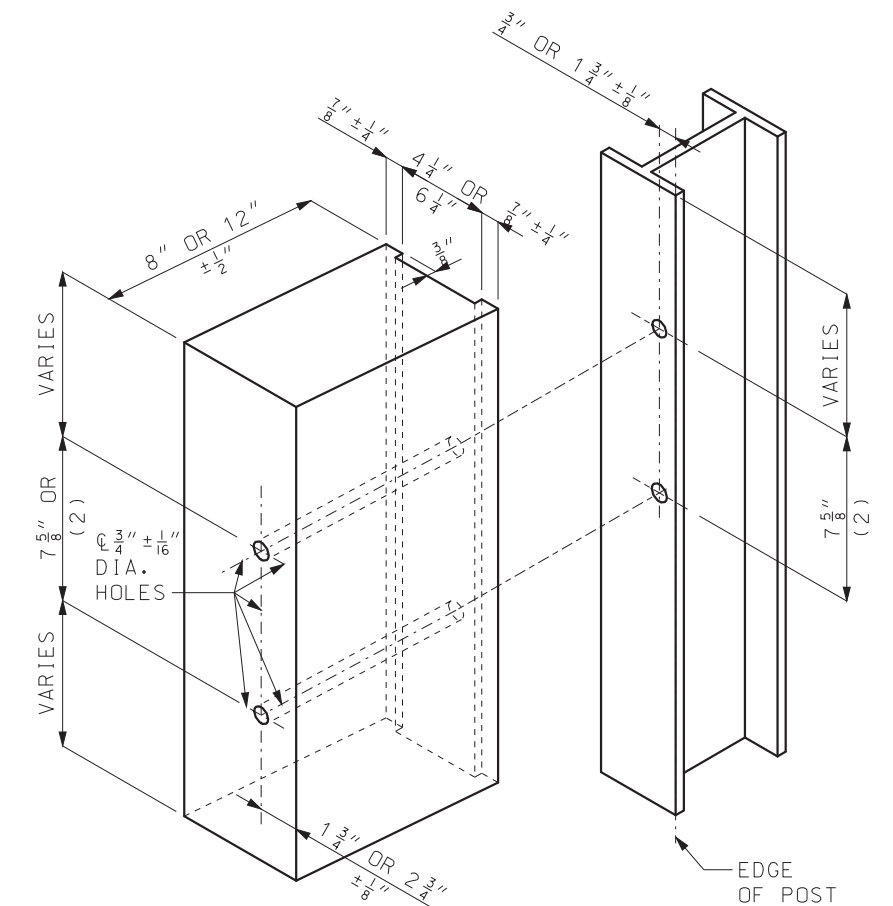
(2) VERIFY BY RAIL TRANSITION PRODUCER.



SECTION H-H
THROUGH THRIE BEAM RAIL

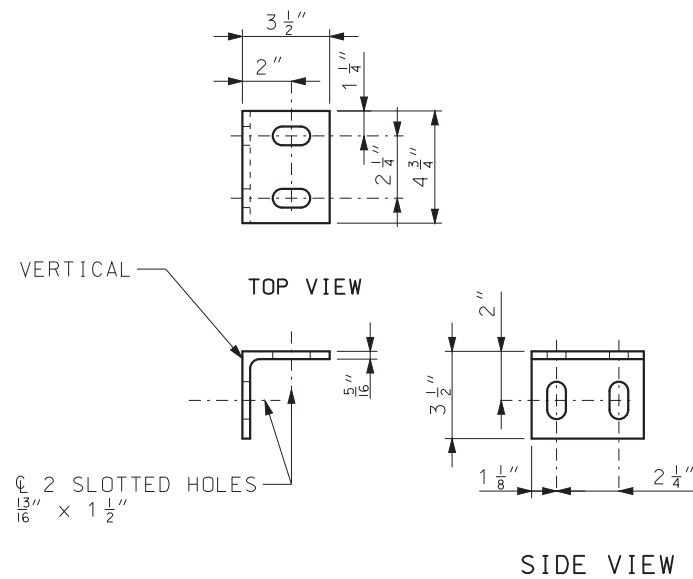
POST (9) - (2) VERIFY BY RAIL TRANSITION PRODUCER (SEE FRONT SHEET)
POST (10) - ONLY 1 HOLE REQUIRED
ALL HOLES 3/4" ± 1/16" DIAMETER EXCEPT AS NOTED

HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD BLOCKS (6" AND 8")



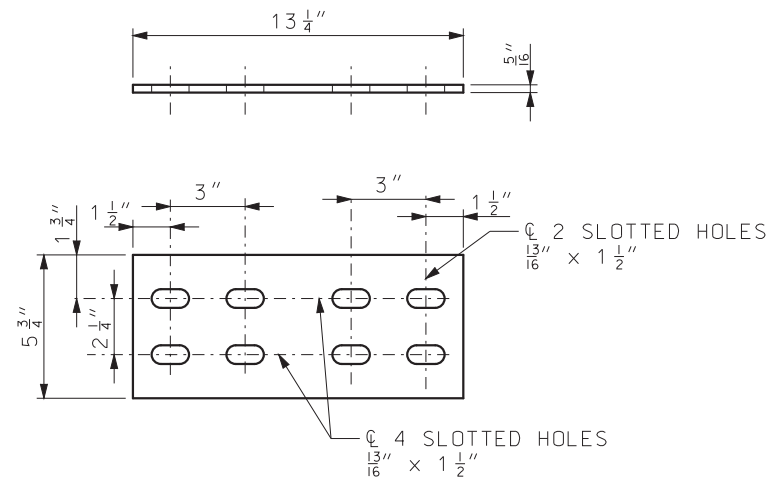
ASYMMETRICAL TRANSITION SECTION

| | | |
|--|--|----------------|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | |
| <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>MIDWEST GUARDRAIL SYSTEM (MGS)</p> <p>BRIDGE APPROACH TRANSITION</p> <p>(THRIE BEAM ON BRIDGE)</p> | |
| | <p>DATE EFFECTIVE: 04/01/2018</p> <p>DATE PREPARED: 2/9/2018</p> | <p>606.70B</p> |

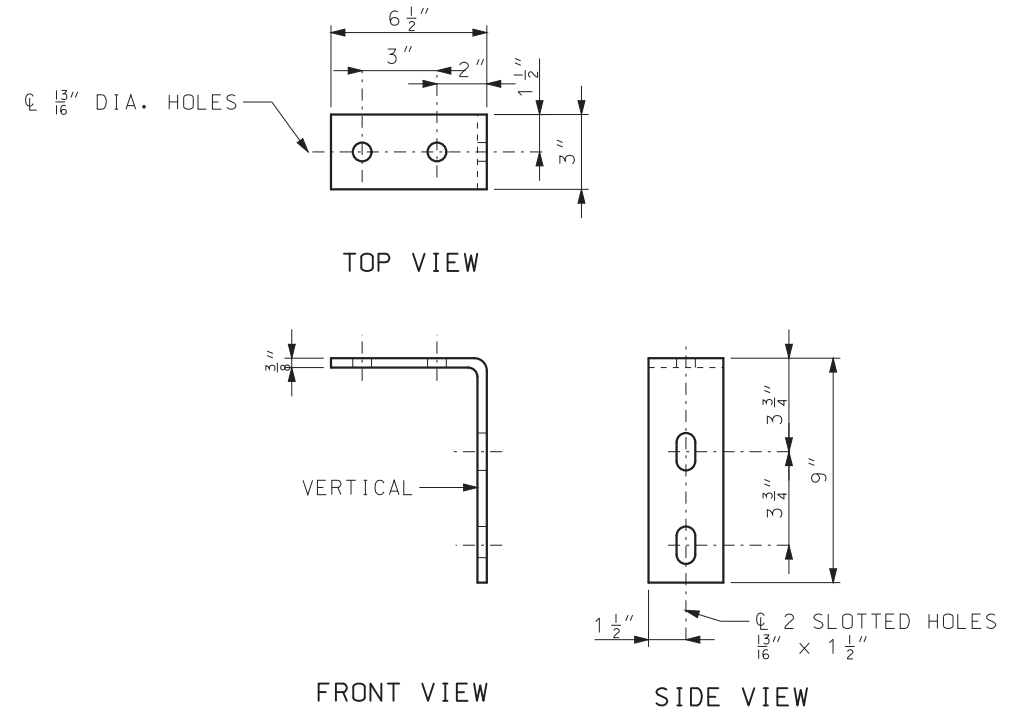


CAP RAIL ANGLE

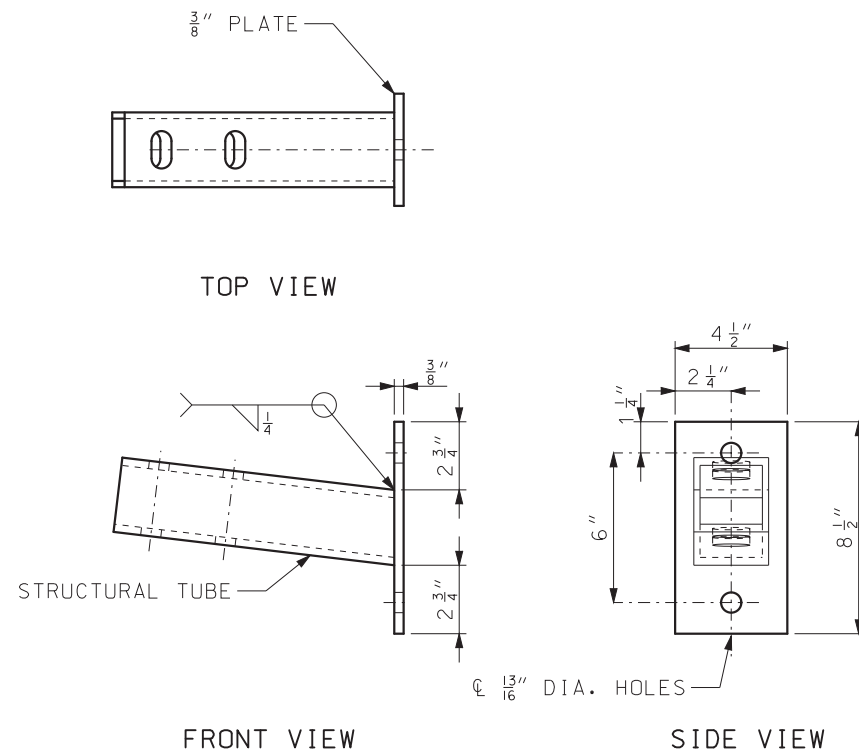
∠ 3 1/2" x 3 1/2" x 5/16"



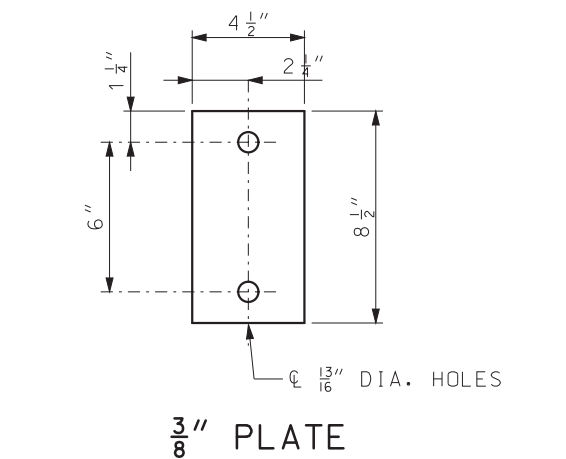
SPLICE PLATE



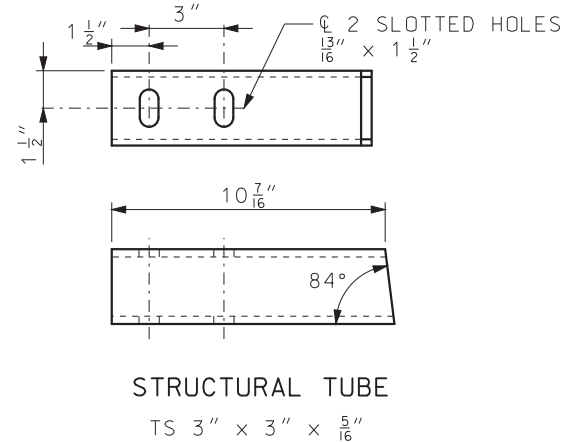
BENT PLATE
CONNECTOR



TERMINATOR ASSEMBLY

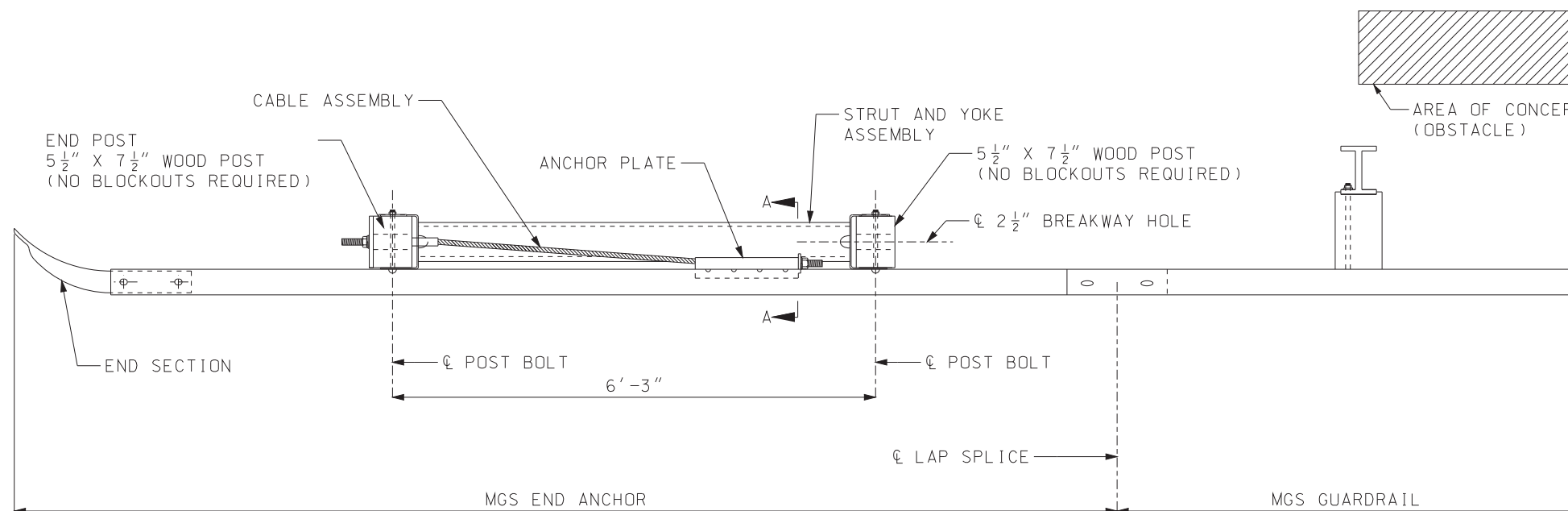


3/8" PLATE

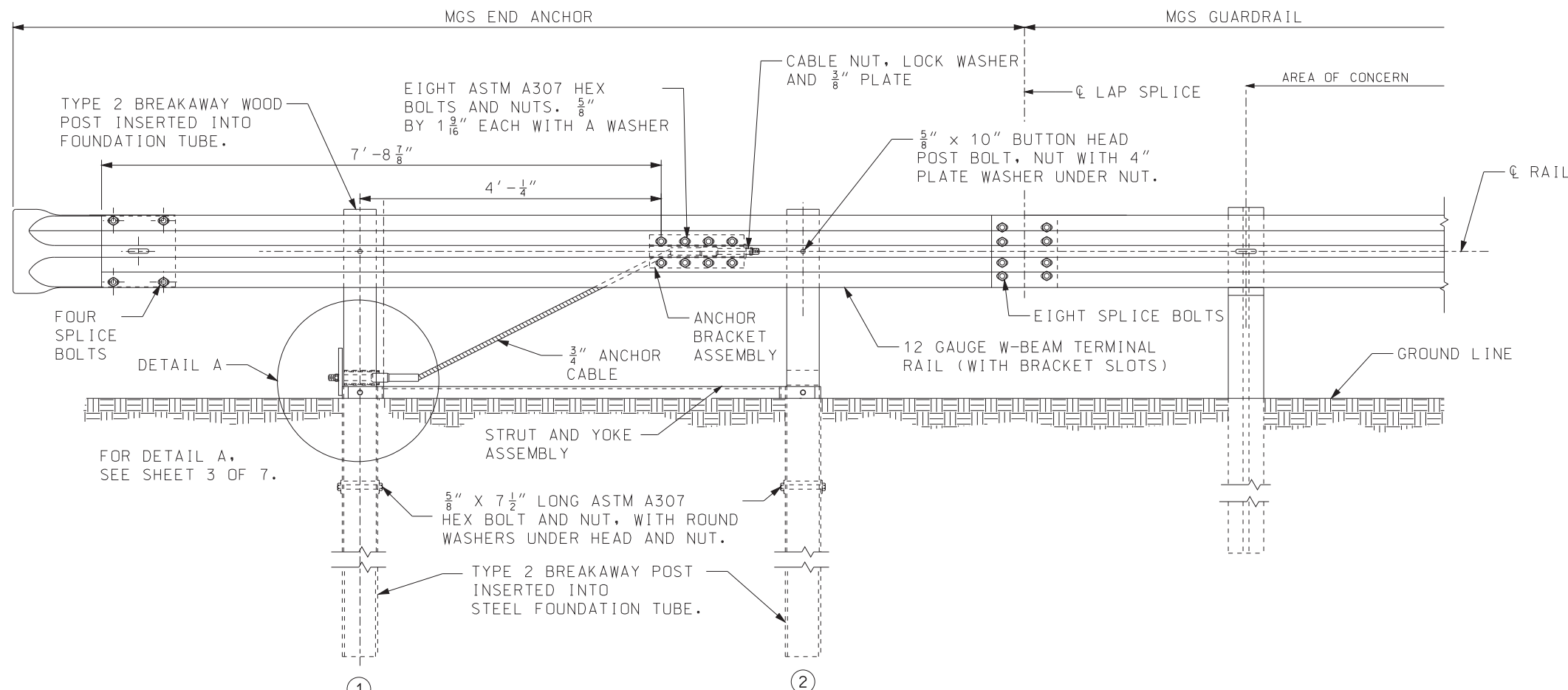


STRUCTURAL TUBE
TS 3" x 3" x 5/16"

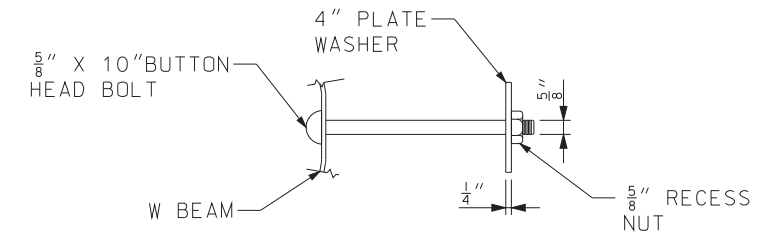
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small> | MIDWEST GUARDRAIL SYSTEM (MGS) BRIDGE APPROACH TRANSITION (THRIE BEAM ON BRIDGE) |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.70B SHEET NO. 5 OF 5 |



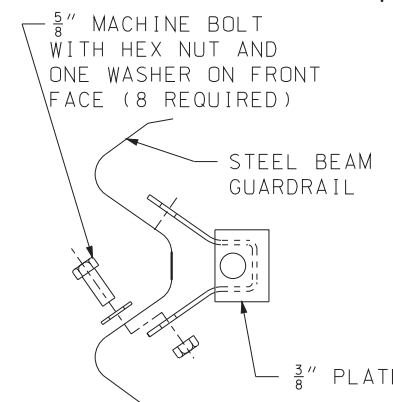
PLAN VIEW



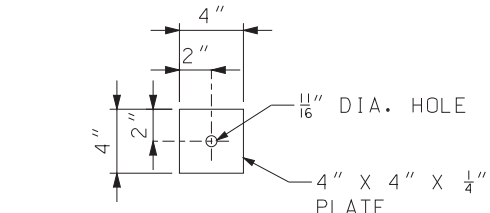
ELEVATION VIEW



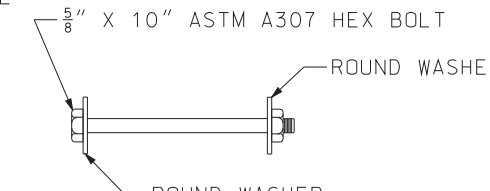
POST BOLT AT W-BEAM



SECTION A-A



4" PLATE WASHER



POST BOLT AT YOKE

GENERAL NOTES:

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON DOWNSTREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR IS REQUIRED.


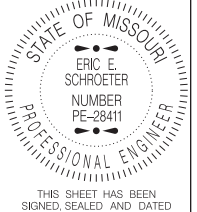
THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM FOR GUARDRAIL.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL HAVE A MINIMUM BREAKING STRENGTH OF 20 TONS.

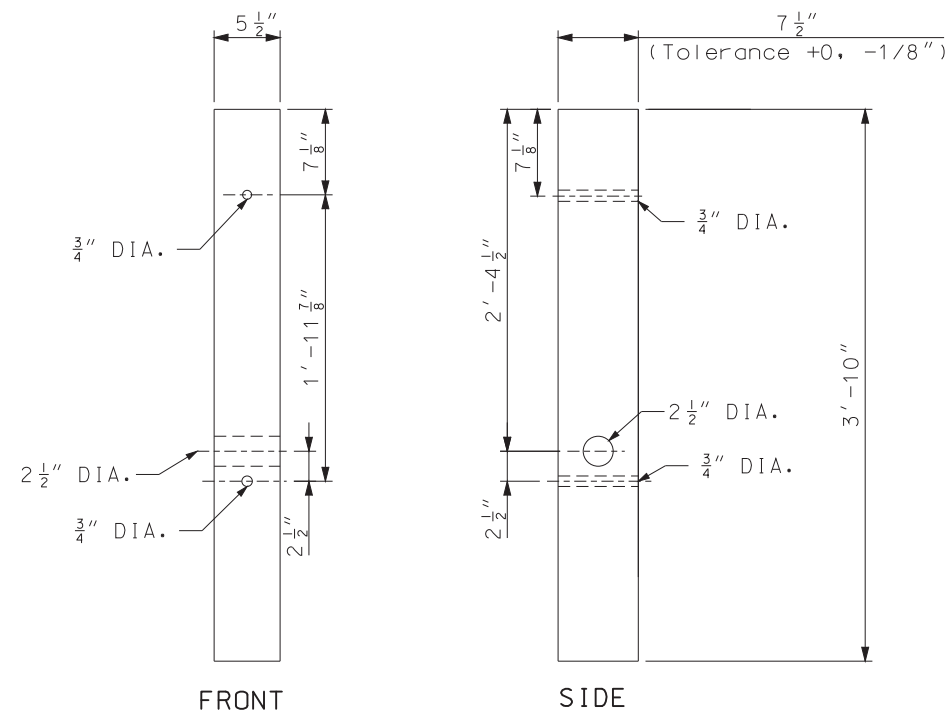
ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 1040.

WOOD POSTS ① AND ② SHALL BE 5 1/2" X 7 1/2".

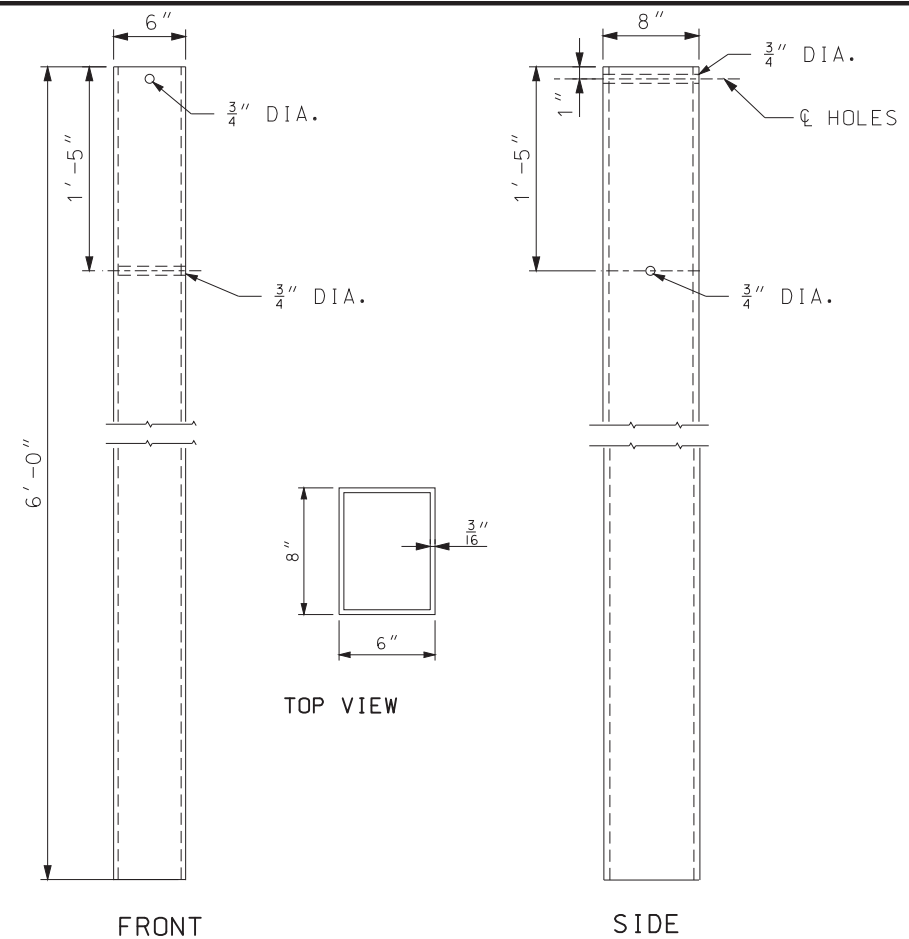
SEE SHEET NO. 2 OF 7 FOR WOOD POST DETAILS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) TERMINAL ANCHOR ENDS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.80C |
| SHEET NO. 1 OF 7 | |

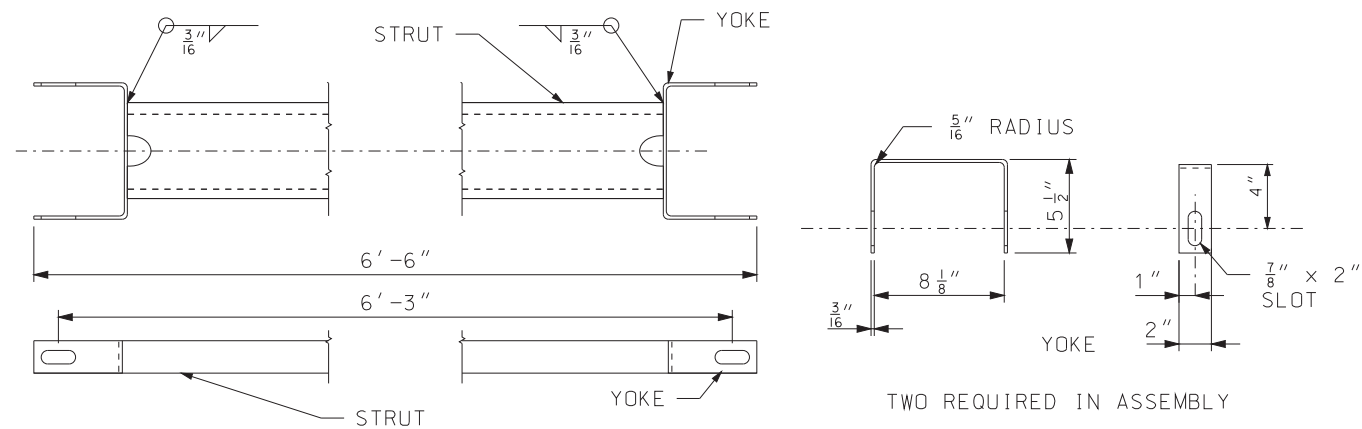
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



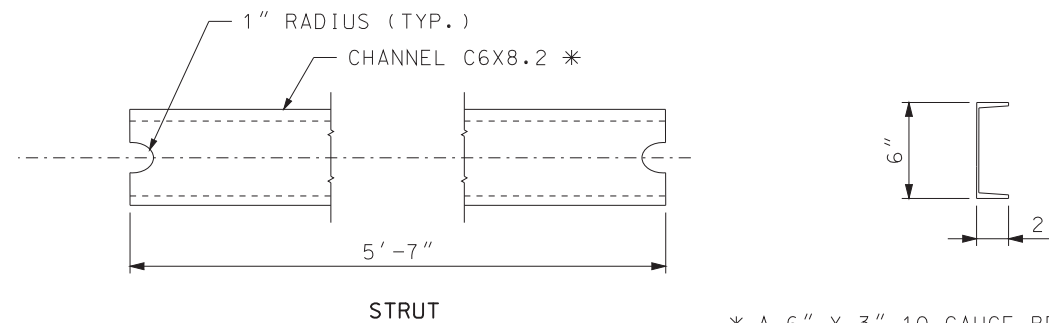
TYPE 2 BREAKAWAY
WOOD POST



STEEL GROUND
FOUNDATION TUBE

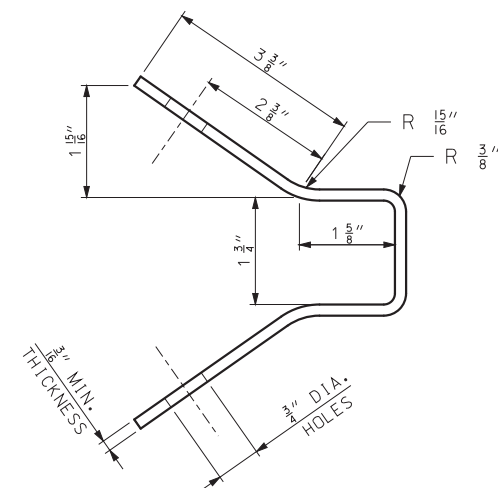


STRUT AND YOKE ASSEMBLY

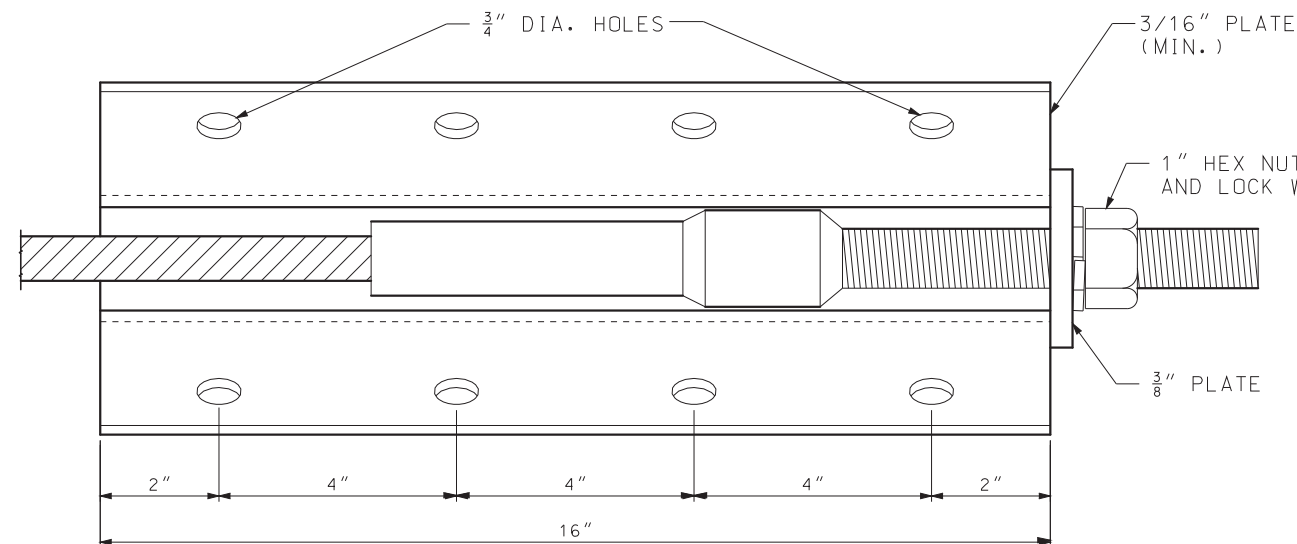


* A 6" X 3" 10 GAUGE BENT PLATE STRUT
MAY BE SUBSTITUTED FOR THE C-CHANNEL

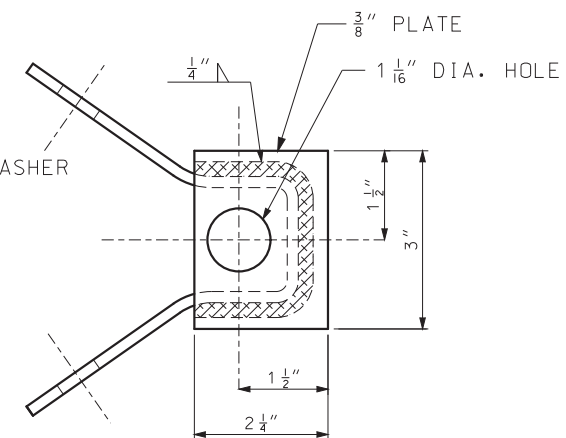
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | MIDWEST GUARDRAIL SYSTEM (MGS) TERMINAL ANCHOR ENDS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.80C |
| SHEET NO. 2 OF 7 | |



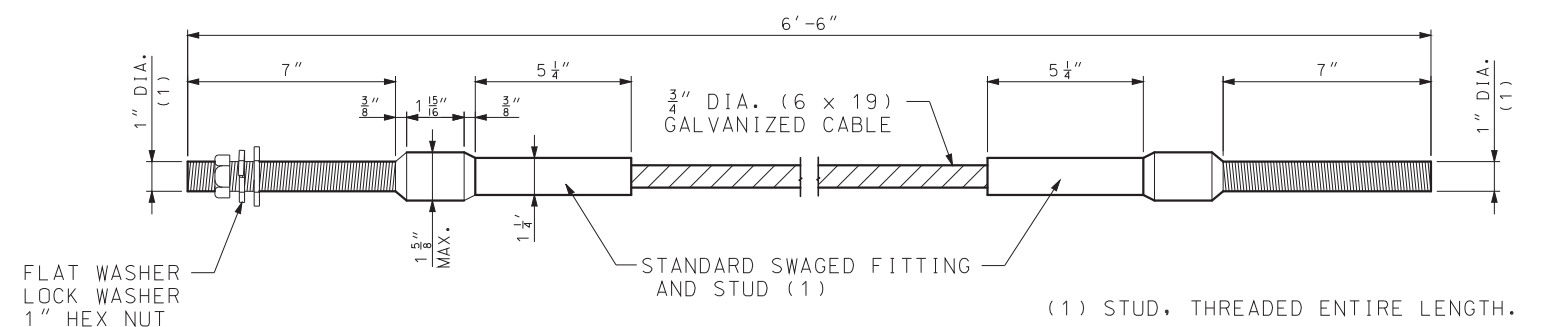
FABRICATION DETAIL



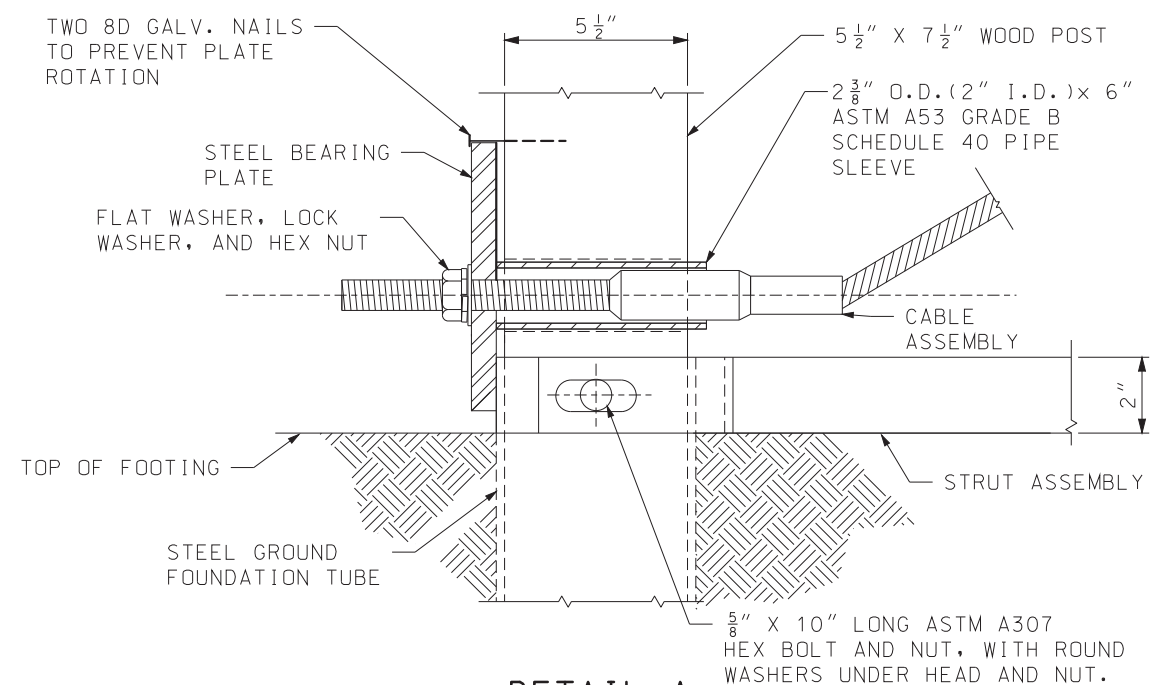
ASSEMBLED VIEW
ANCHOR BRACKET



END VIEW

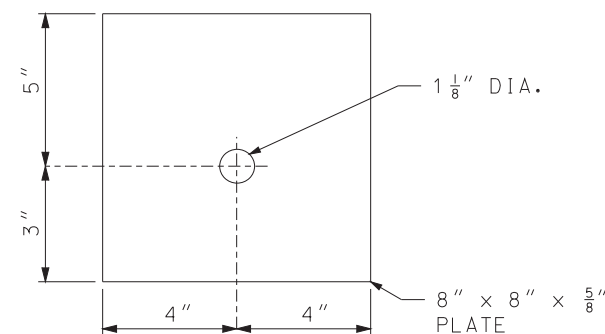


CABLE ASSEMBLY



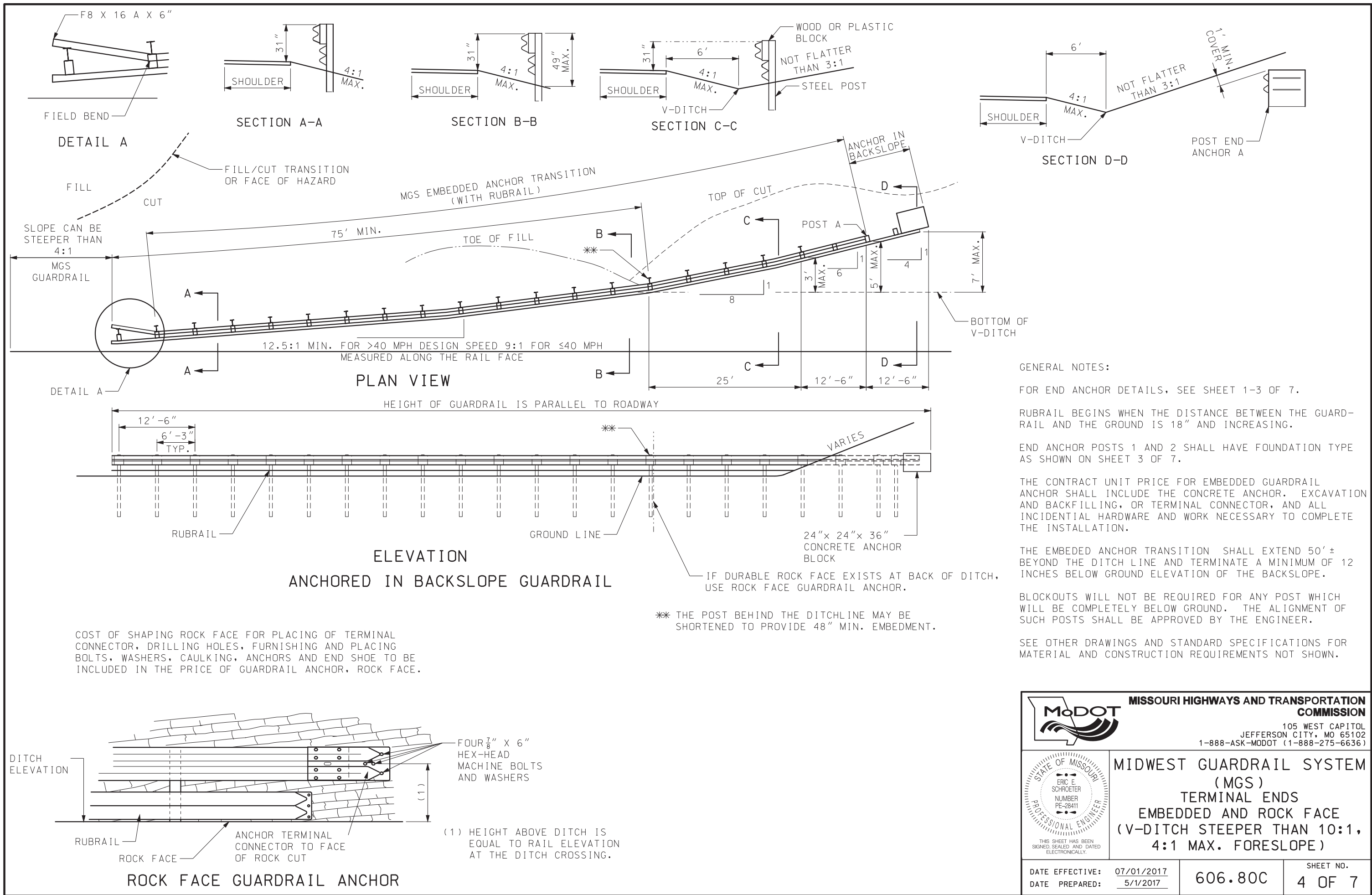
DETAIL A
(END POST DETAIL)

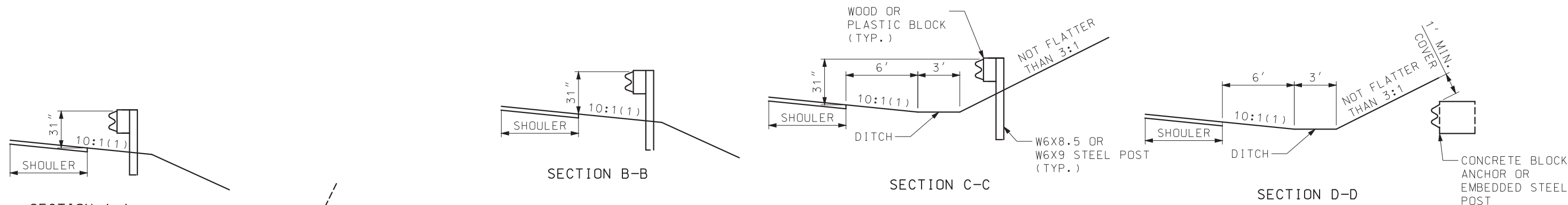
FOR LOCATION OF DETAIL A, SEE SHEET 1 OF 7.



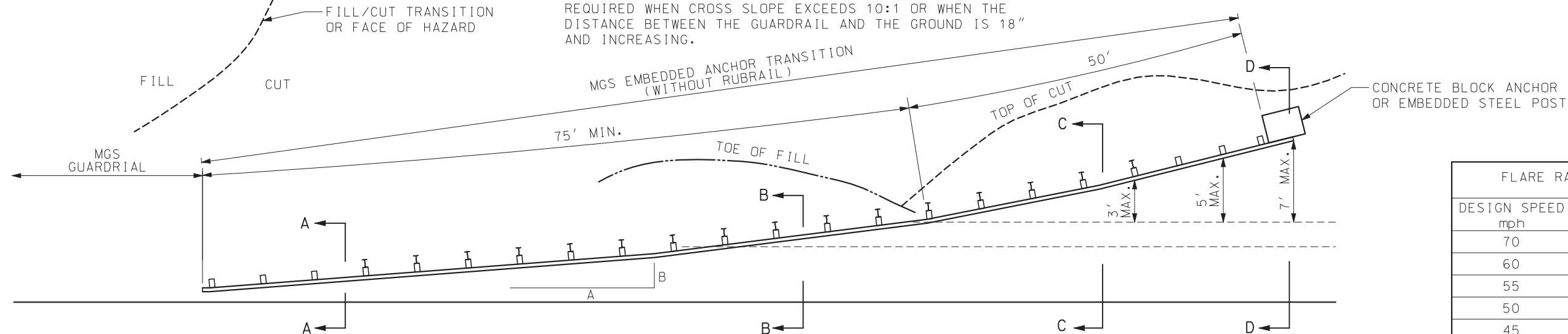
STEEL BEARING PLATE

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) TERMINAL ANCHOR ENDS |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 606.80C |
| SHEET NO. 3 OF 7 | |

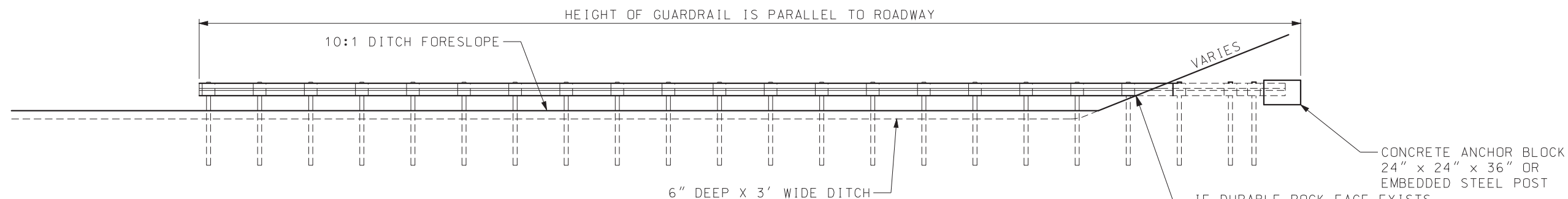




(1) MAX. CROSS SLOPE SHALL NOT EXCEED 4:1. RUBRAIL IS REQUIRED WHEN CROSS SLOPE EXCEEDS 10:1 OR WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.



| FLARE RATE | |
|---------------------|------|
| DESIGN SPEED mph | A:B |
| 70 | 15:1 |
| 60 | 13:1 |
| 55 | 12:1 |
| 50 | 11:1 |
| 45 | 10:1 |
| 40 | 9:1 |
| 30 OR LESS | 7:1 |



ANCHORED IN BACKSLOPE GUARDRAIL

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MIDWEST GUARDRAIL SYSTEM (MGS)
EMBEDDED ANCHOR TRANSITION
EMBEDDED TERMINAL ENDS (FLAT DITCH)

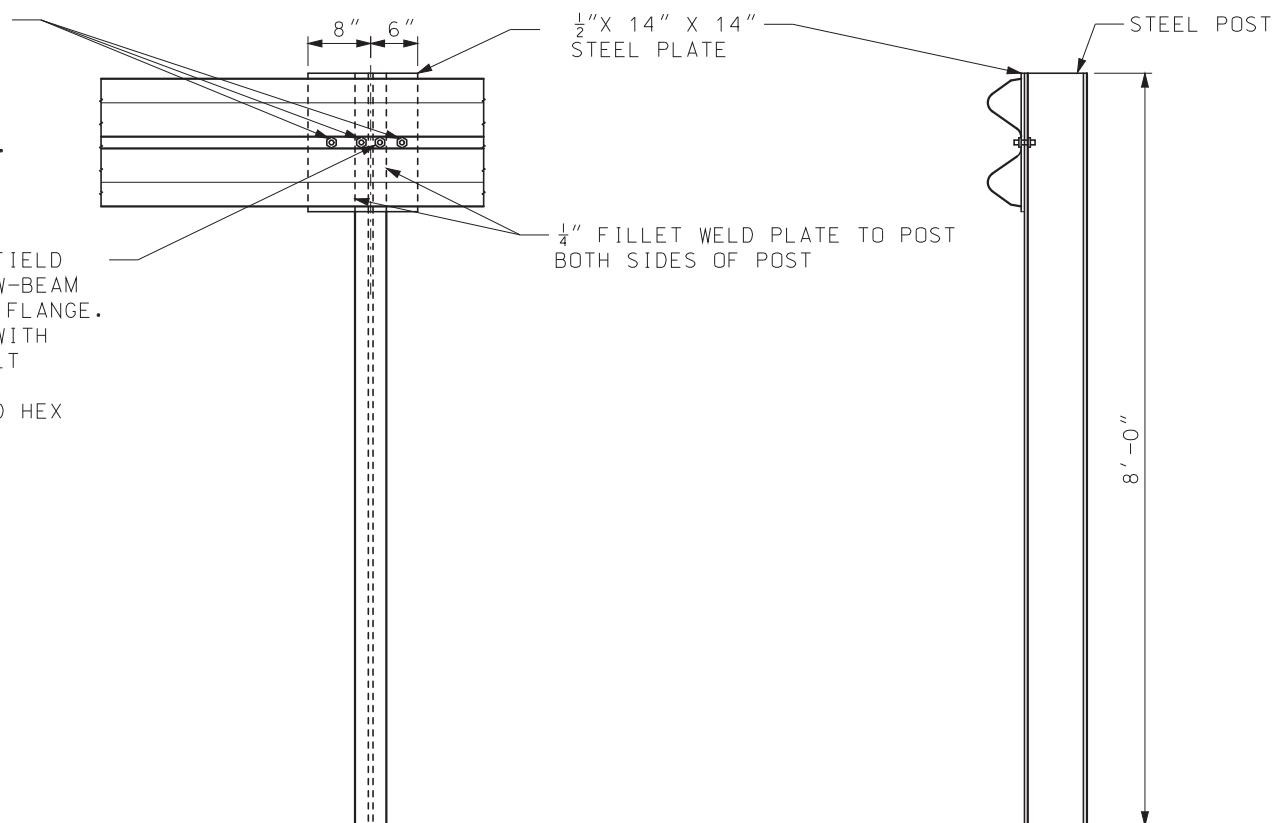
DATE EFFECTIVE: 07/01/2017
DATE PREPARED: 5/1/2017

606.80C

SHEET NO.
5 OF 7

3 - 1" Ø HOLES TO BE
FIELD DRILLED IN W-BEAM
ELEMENT AND ATTACHED WITH
 $\frac{7}{8}$ " Ø HEX HEAD BOLTS
 $1\frac{7}{16}$ " LONG EACH WITH ONE
SQUARE WASHER AND HEX NUT.

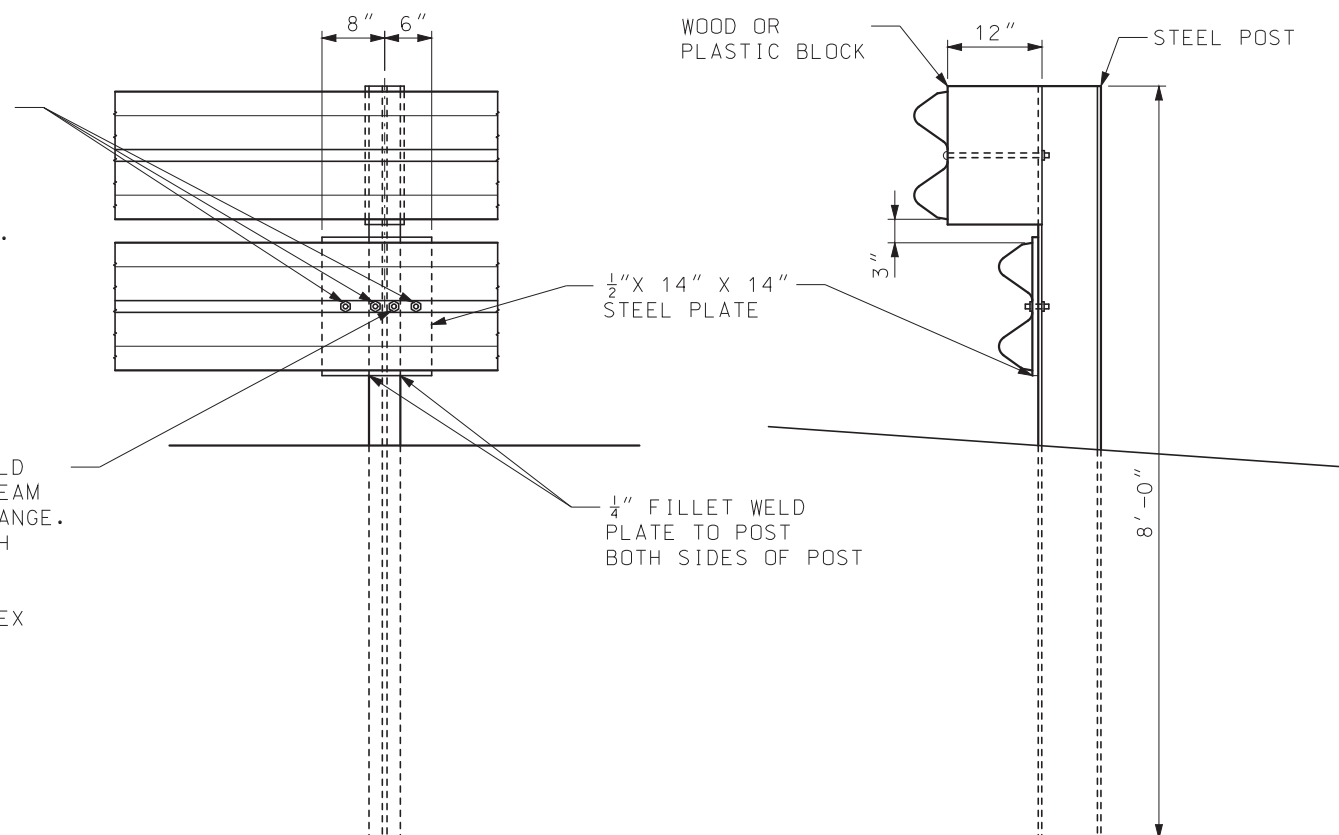
1" Ø HOLE TO BE FIELD
DRILLED THROUGH W-BEAM
AND THROUGH POST FLANGE.
ATTACHED W-BEAM WITH
 $\frac{7}{8}$ " Ø HEX HEAD BOLT
2" LONG WITH ONE
SQUARE WASHER AND HEX
NUT.



EMBEDDED STEEL POST

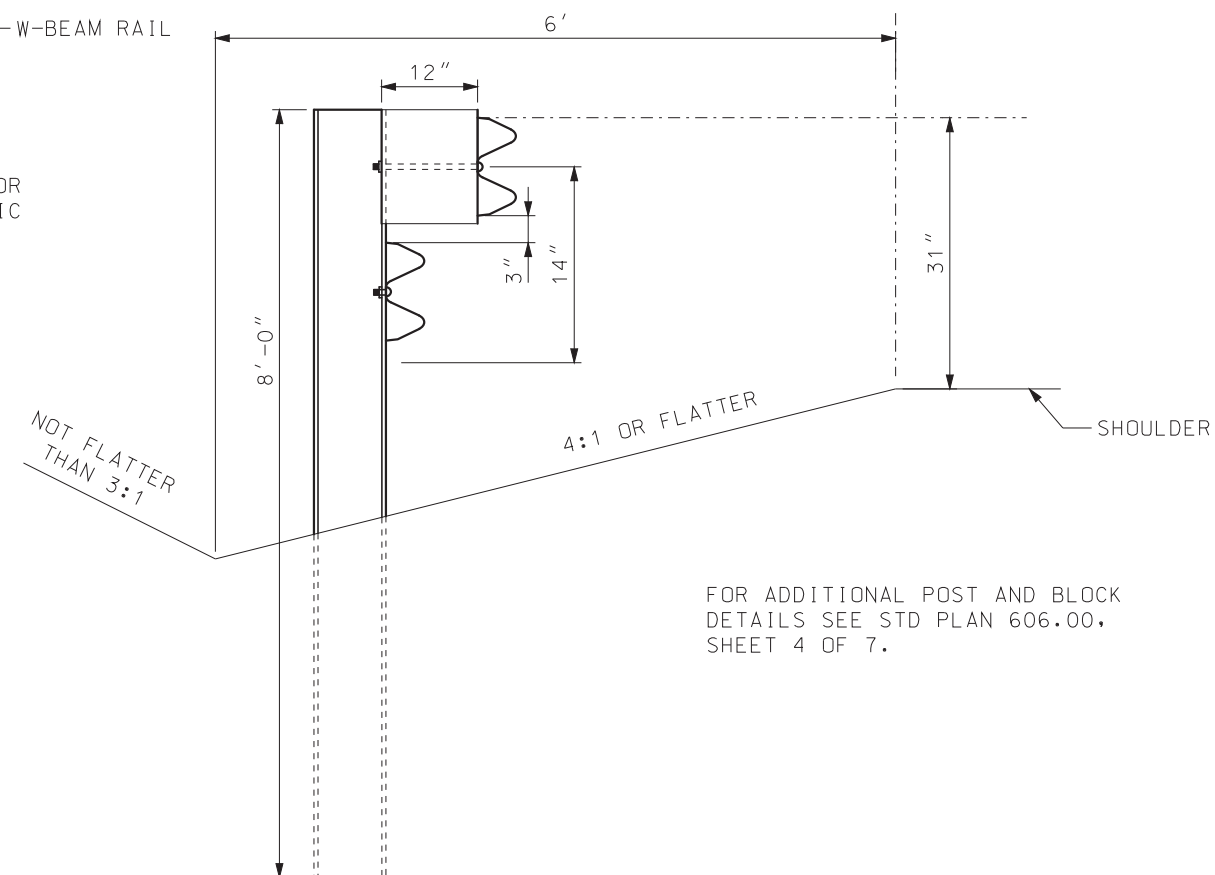
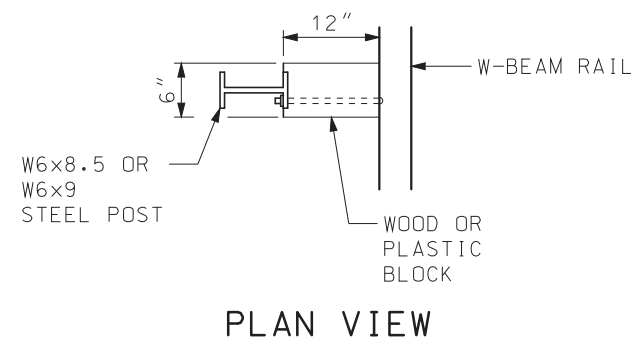
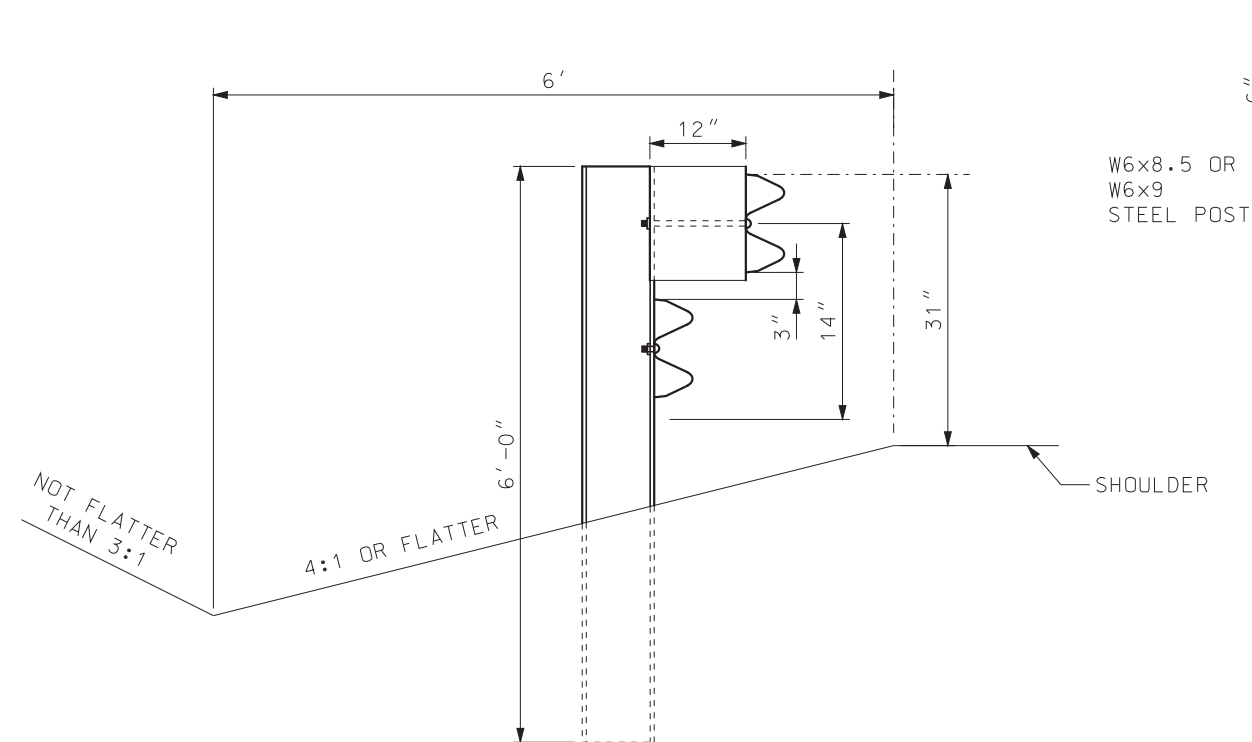
3 - 1" Ø HOLES TO BE
FIELD DRILLED IN W-BEAM
ELEMENT AND ATTACHED WITH
 $\frac{7}{8}$ " Ø HEX HEAD BOLTS
 $1\frac{7}{16}$ " LONG EACH WITH ONE
SQUARE WASHER AND HEX NUT.

1" Ø HOLE TO BE FIELD
DRILLED THROUGH W-BEAM
AND THROUGH POST FLANGE.
ATTACHED W-BEAM WITH
 $\frac{7}{8}$ " Ø HEX HEAD BOLT
2" LONG WITH ONE
SQUARE WASHER AND HEX
NUT.

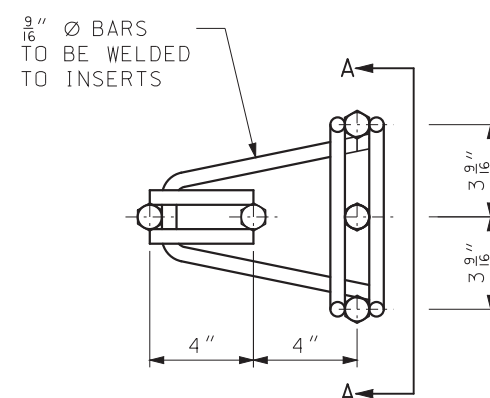
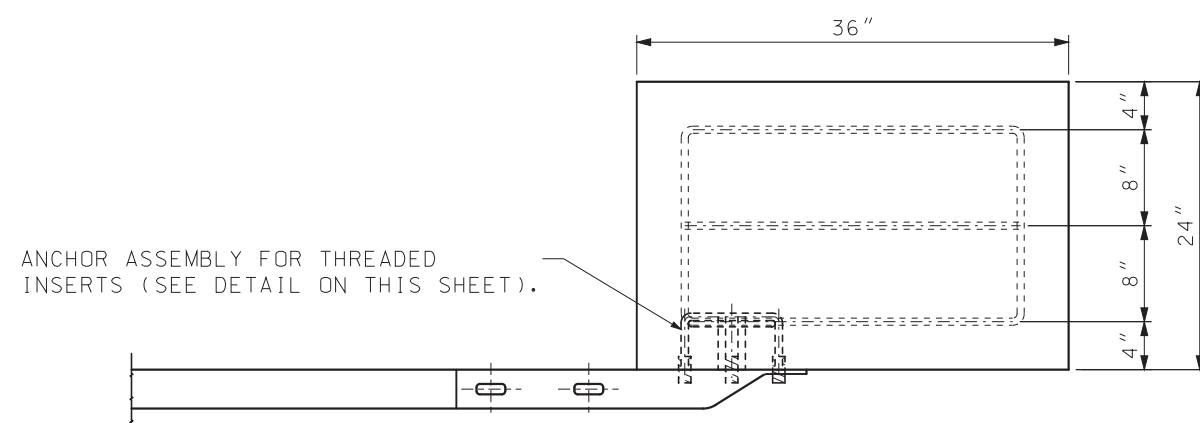


SPECIAL RUBRAIL TO POST CONNECTION AT POST A

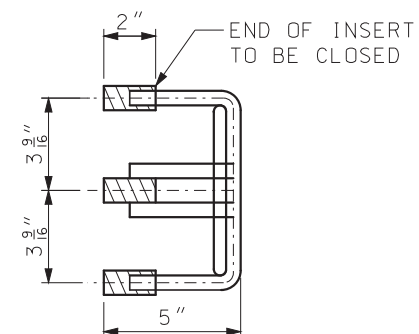
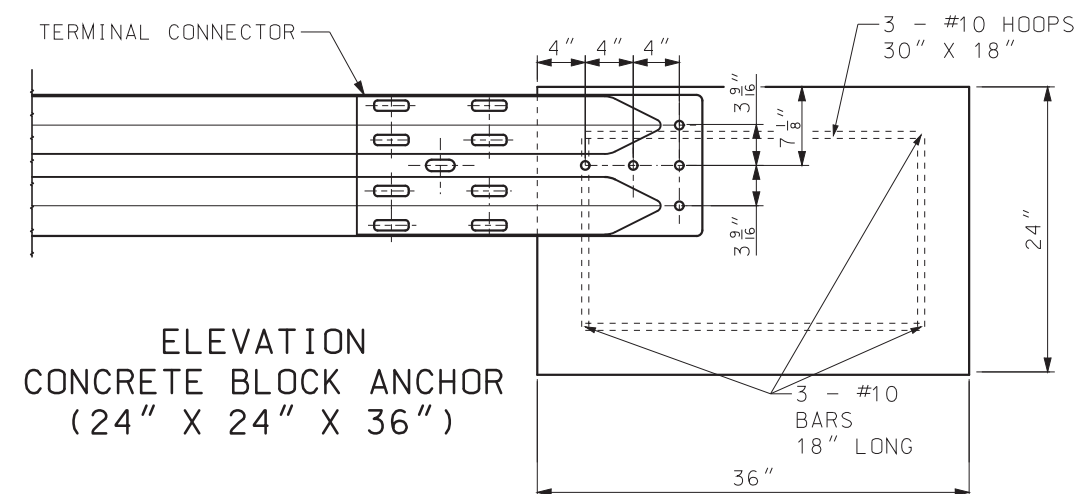
| | | | |
|---|--|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | MIDWEST GUARDRAIL SYSTEM (MGS) | | |
| | EMBEDDED ANCHOR TERMINAL ENDS (STEEL POST OPTION) | | |
| DATE EFFECTIVE: | 07/01/2017 | 606.80C | SHEET NO. 6 OF 7 |
| DATE PREPARED: | 5/1/2017 | | |





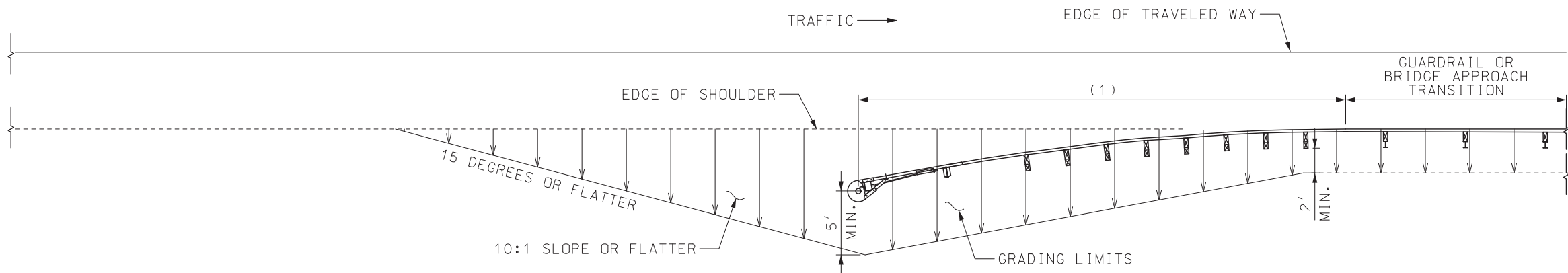
FOR ADDITIONAL POST AND BLOCK
DETAILS SEE STD PLAN 606.00,
SHEET 4 OF 7.



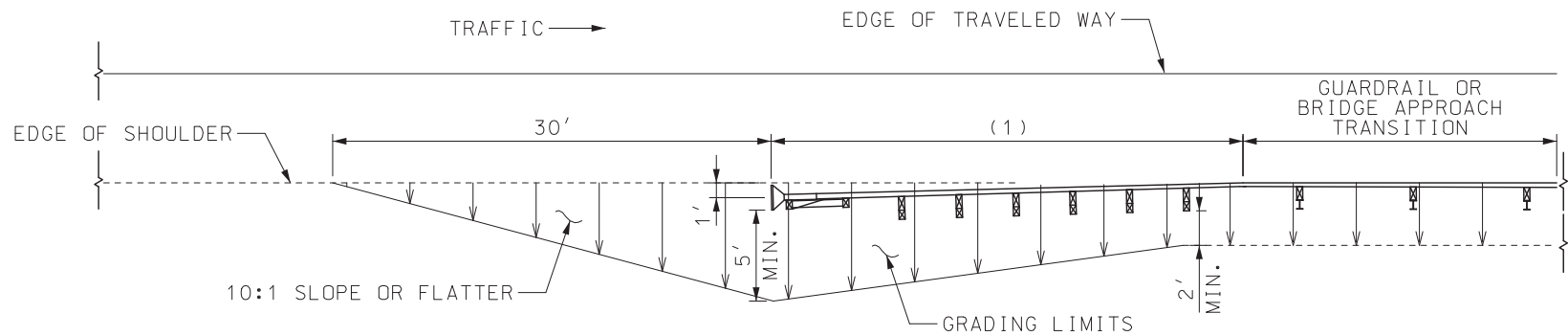
THREADED INSERTS FOR $\frac{15}{16}$ " X 2"
ALVANIZED HEX HEAD CAP SCREWS.
CAP SCREWS TO BE THREADED A
MINIMUM $1\frac{7}{8}$ ". INSERTS THREADED
MINIMUM OF $1\frac{3}{4}$ ".



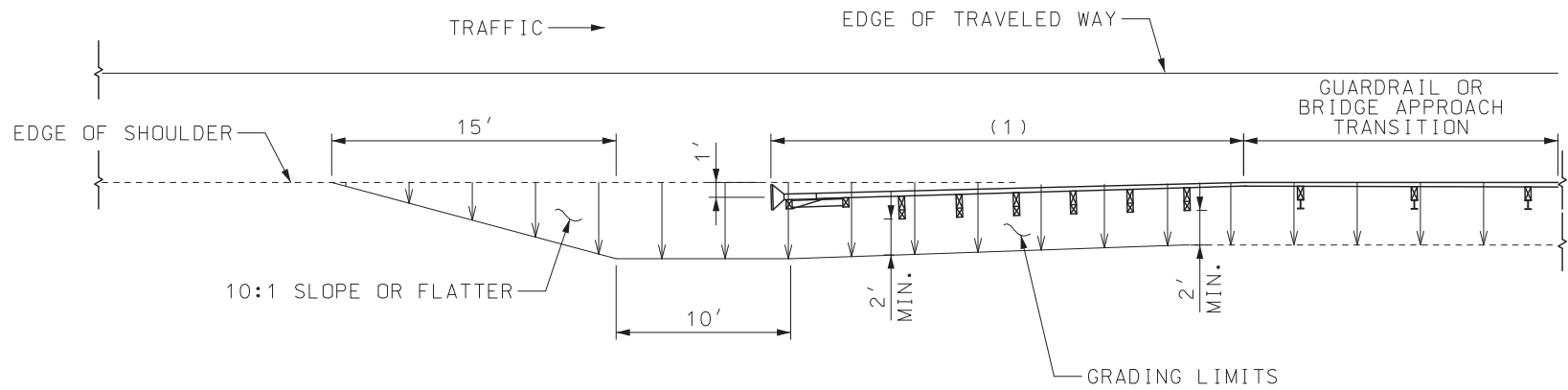
| | | | |
|--|-------------------|--|-----------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY.</p> | | MIDWEST GUARDRAIL SYSTEM (MGS) EMBEDDED TERMINAL ENDS GENERAL DETAILS | |
| DATE EFFECTIVE: | <u>07/01/2017</u> | 606.80C | SHEET NO. |
| DATE PREPARED: | <u>5/1/2017</u> | | 7 OF 7 |



GRADING LIMITS FOR FLARED CRASHWORTHY END TERMINALS



STANDARD GRADING LIMITS FOR CRASHWORTHY END TERMINALS




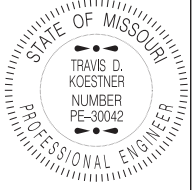
ALTERNATE GRADING LIMITS FOR CRASHWORTHY END TERMINALS

GENERAL NOTES:

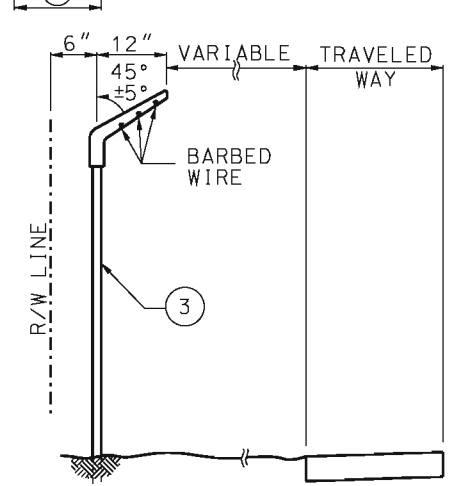
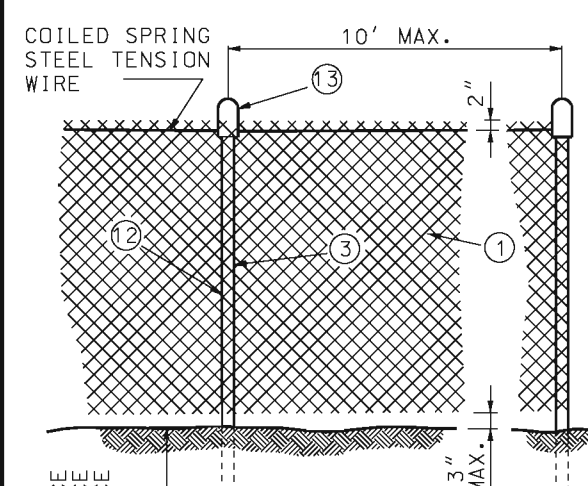
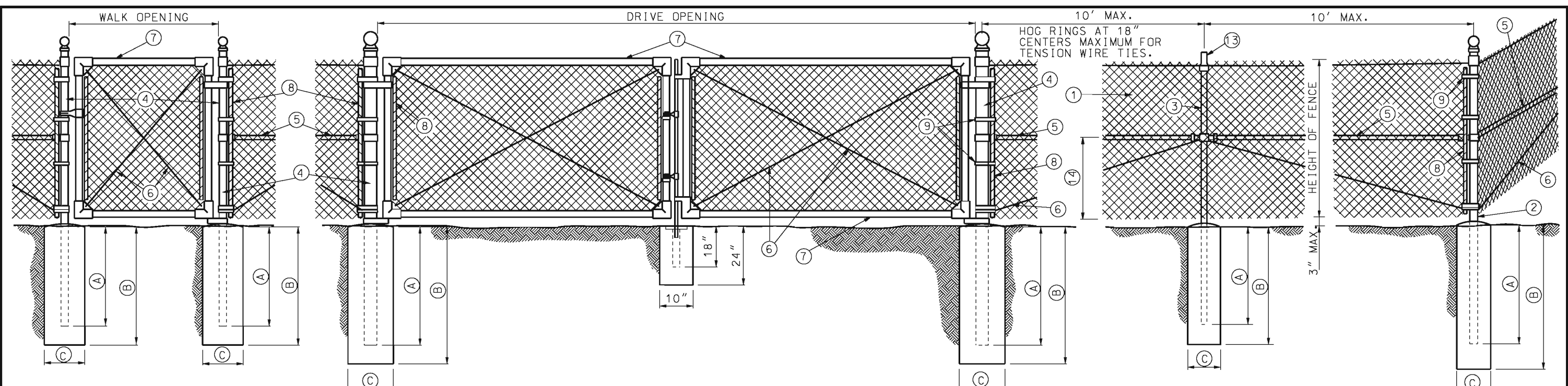
STANDARD GRADING LIMITS SHALL BE USED WHEN CONSTRUCTING A NEW ROADBED. ALTERNATE GRADING LIMITS ARE ALLOWABLE ON EXISTING ROADBEDS EXCEPT WHEN STANDARD GRADING IS INDICATED ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE MASH APPROVED CRASHWORTHY END TERMINAL.

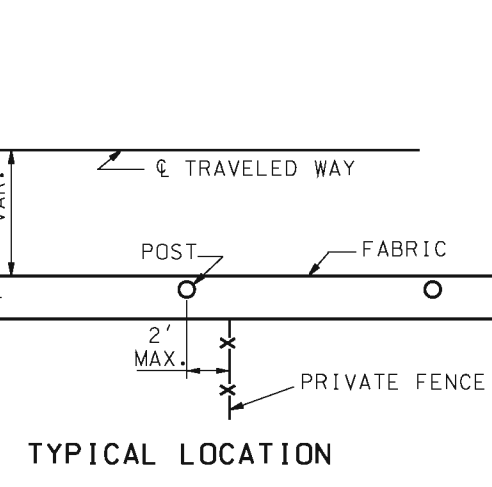
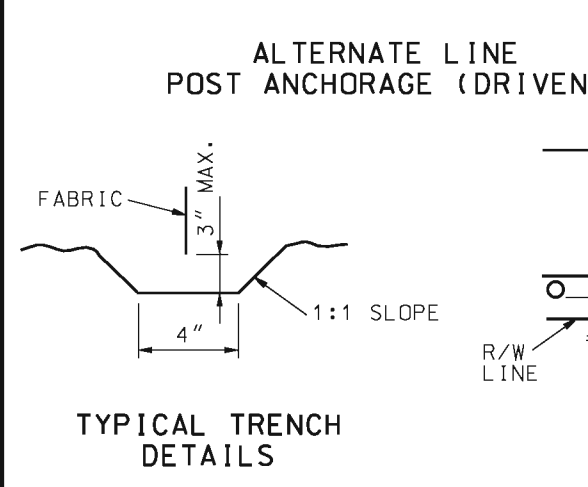
END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINALS ARE NOT REQUIRED.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>MASH CRASHWORTHY END TERMINALS TYPE A GRADING LIMITS</p> |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 606.81B |
| SHEET NO. 1 OF 1 | |

(1) APPROVED CRASHWORTHY END TERMINAL



NOTE: IF POSTS CANNOT BE DRIVEN TO DEPTHS INDICATED BECAUSE OF ROCKY SOILS OR OTHER CONDITIONS, THEY SHALL BE REMOVED AND REPLACED IN FOOTINGS. POST TOPS SHALL BE PROTECTED AGAINST DAMAGE AND ALL POSTS WHICH ARE DAMAGED DURING INSTALLATION SHALL BE REMOVED AND REPLACED.



MINIMUM DEPTH FOR SETTING POSTS

| DESCRIPTION | | HEIGHT OF FENCE | | |
|-------------------------|-----|-----------------|-----|-----|
| | | 48" | 60" | 72" |
| ② ENDCORNER & PULL POST | (A) | 30" | 36" | 36" |
| | (B) | 36" | 42" | 42" |
| | (C) | 10" | 12" | 12" |
| ③ LINE POST | (A) | 24" | 27" | 36" |
| | (B) | 30" | 36" | 42" |
| | (C) | 10" | 12" | 12" |
| ④ GATE POST | (A) | 30" | 36" | 36" |
| | (B) | 36" | 42" | 42" |
| | (C) | 10" | 12" | 12" |

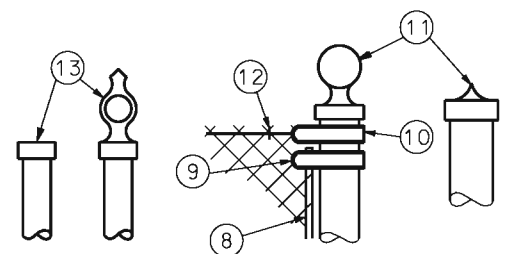
WIRE SIZE AND HEIGHT OF FABRIC

| SPECIFIED DIAMETER | | | HEIGHT OF FABRIC INCHES |
|--------------------|------|-------------|-------------------------|
| INCHES | GAGE | MESH INCHES | |
| 0.120 | 11 | 2 | 36, 42 |
| 0.148 | 9 | 2 | 48, 60 |
| 0.192 | 6 | 2 | 72, 84 |

- LEGEND
- ① FABRIC
 - ② END, CORNER OR PULL POST
 - ③ LINE POST
 - ④ GATE POST
 - ⑤ BRACE
 - ⑥ TRUSS ROD
 - ⑦ GATE FRAME
 - ⑧ STRETCHER BAR 1/4" X 3/4" PLATE
 - ⑨ STRETCHER BAR BAND
 - ⑩ END OR CORNER CLAMP
 - ⑪ POST TOPS (OTHER THAN LINE POSTS)
 - ⑫ FABRIC TIES
 - ⑬ LINE POST TOPS WITH OR WITHOUT TOP RAILS
 - ⑭ ONE-HALF FABRIC HEIGHT OR AS RECOMMENDED BY MANUFACTURER

MINIMUM SIZE FOR FENCE HARDWARE

| | WIDTH | SIZE (IN.) | LBS/FT. |
|---|-------|------------|---------|
| ② END CORNER OR PULL POST | N/A | 2 1/2 DIA. | 5.79 |
| ③ LINE POST | N/A | 2" DIA. | 3.65 |
| ④ GATE POST (SINGLE GATE OR 1 LEAF OF DOUBLE) | ≤ 6' | 2 1/2 DIA. | 5.79 |
| | ≤ 13' | 3 1/2 DIA. | 9.10 |
| | ≤ 18' | 6 DIA. | 18.97 |
| | > 18' | 8 DIA. | 24.70 |
| ⑤ BRACE | N/A | 1 1/4 DIA. | 2.27 |
| ⑥ TRUSS ROD | N/A | 3/8 | - |
| ⑦ GATE FRAME | N/A | 1 1/2 DIA. | 2.72 |



POST TOPS TO BE PRESSURE FITTED OR SCREWED. POST TOPS MAY BE ELIMINATED FOR ALL POSTS EXCEPT PIPE POSTS. IF POST TOPS ARE ELIMINATED, POST LENGTH SHALL BE INCREASED 3".

GENERAL NOTES:

WEIGHTS OF MATERIALS SHOWN IN TABLE ARE FOR ASTM F 1043, GROUP 1A. SIZES SHOWN ARE FOR STEEL AND ALUMINUM. EQUIVALENT ASTM F 1043 ALTERNATIVES MAY BE USED.

PULL POSTS SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE OR AT APPROXIMATE 500' CENTERS ON STRAIGHT RUNS OR AS DIRECTED BY THE ENGINEER.

DRILLED HOLES © IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 2" GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

ALL POSTS SHALL HAVE PROVISIONS TO SECURELY HOLD THE TOP TENSION WIRE IN POSITION AND ALLOW FOR REMOVAL AND REPLACEMENT OF A POST WITHOUT DAMAGING THE TOP TENSION WIRE.

THE MESH SIZE SHALL BE 2 INCHES ± 1/8 IN. MEASURED IN EITHER DIRECTION AS THE MINIMUM CLEAR DISTANCE BETWEEN THE WIRES FORMING THE PARALLEL SIDES OF THE MESH.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CHAIN-LINK FENCE

STATE OF MISSOURI
KATHRYN PHILLIPS HARVEY
NUMBER PE-23751
PROFESSIONAL ENGINEER

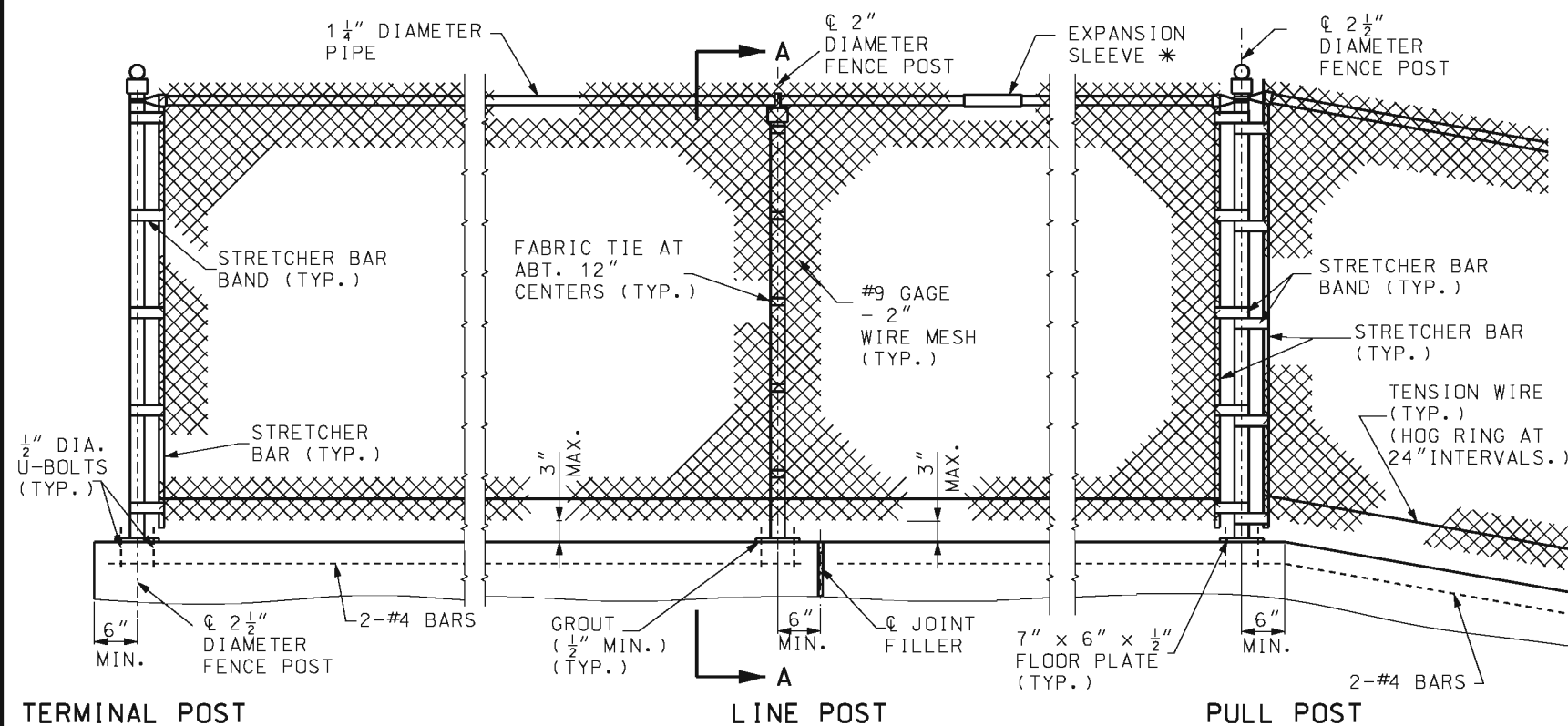
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

607.10V

SHEET NO.
1 OF 1

DATE EFFECTIVE: 02/01/2007
DATE PREPARED: 8/21/2009

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TERMINAL POST

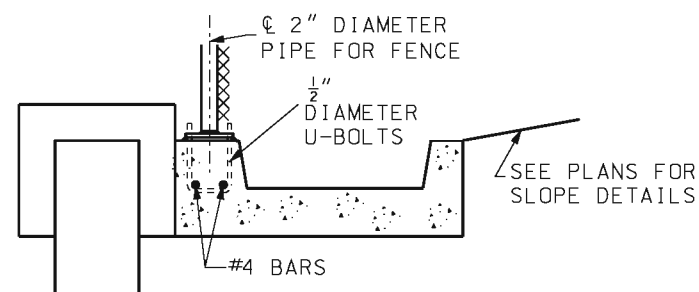
LINE POST

PULL POST

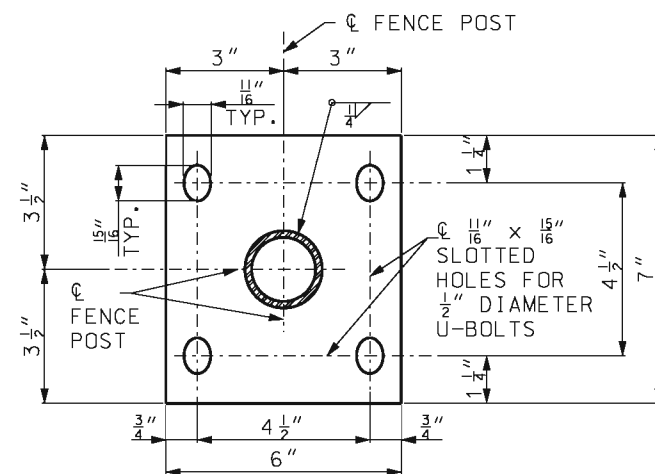
SECTION A-A

* PLACE EXPANSION SLEEVE AT ABOUT 30'-0" CENTERS WITH AT LEAST ONE EXPANSION SLEEVE BETWEEN PULL POSTS.

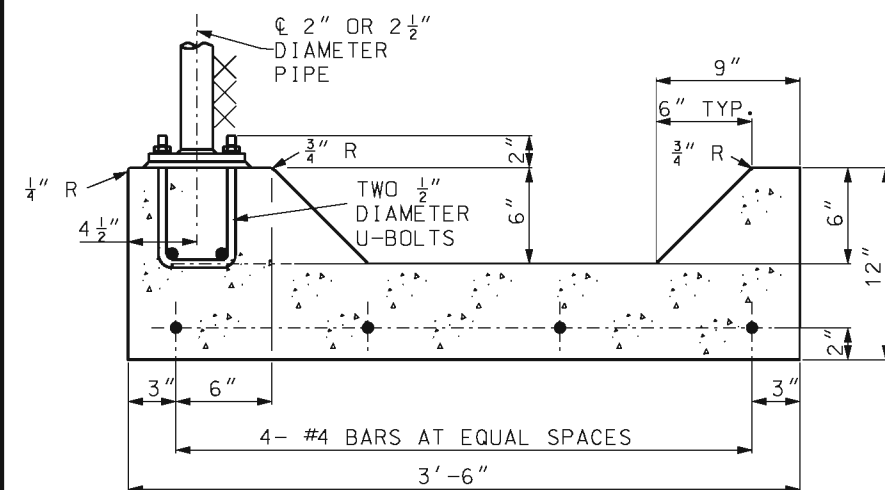
PART ELEVATION (TYPICAL)



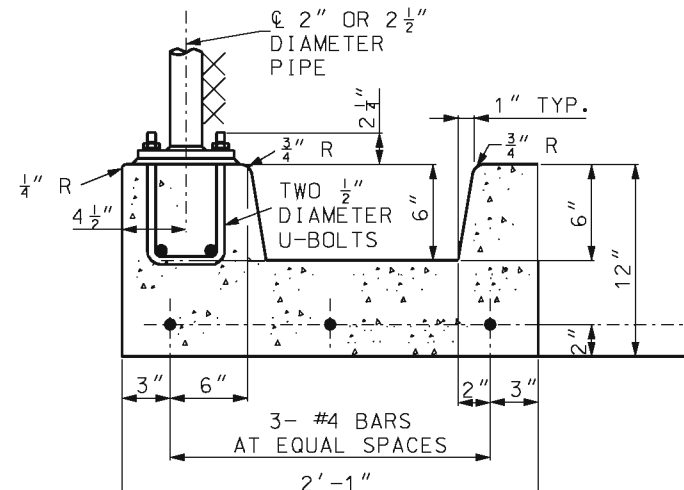
ALTERNATE SECTION A-A FOR MSE WALLS



PLAN OF FLOOR PLATE

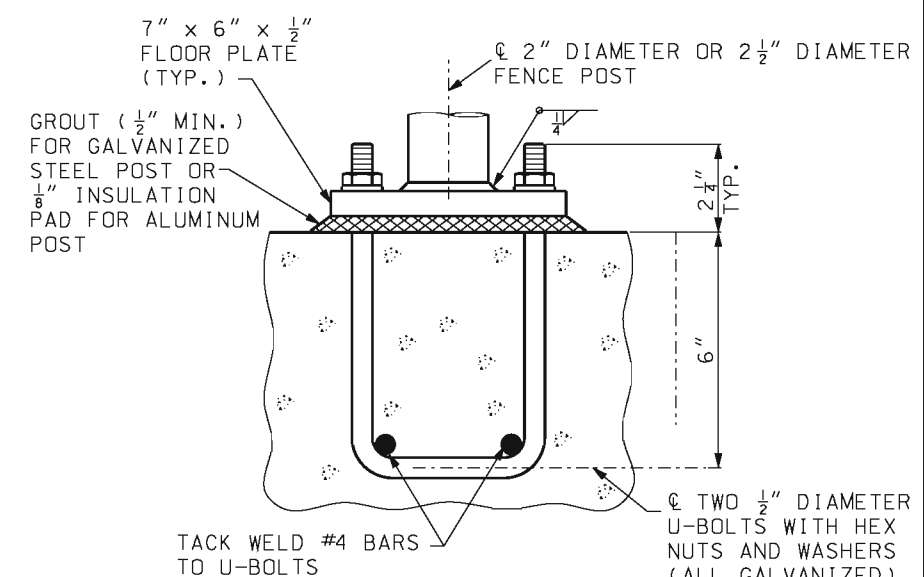


MODIFIED TYPE A GUTTER



MODIFIED TYPE B GUTTER

FENCE CONNECTION FOR MSE WALLS



TYPICAL FENCE POST CONNECTION

GENERAL NOTES:

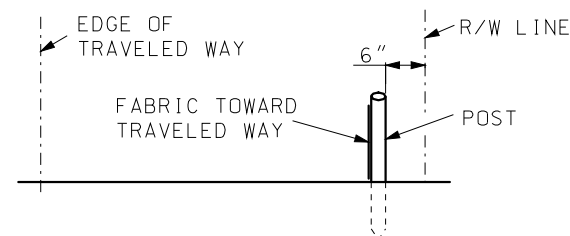
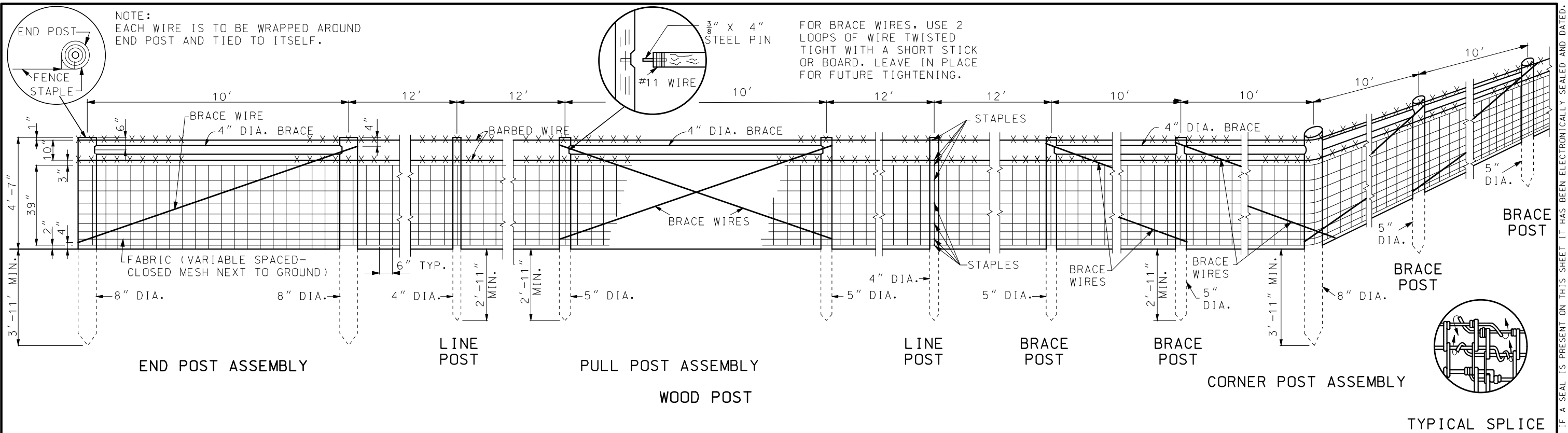
PAYMENT FOR U-BOLTS WITH NUTS, WASHERS, AND #4 BARS WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR CHAIN-LINK FENCE (RETAINING WALLS).

PULL POST SHALL BE USED AT SHARP BREAKS IN VERTICAL GRADE OR AT APPROXIMATE 100'-0" CENTERS ON STRAIGHT RUNS.

THE CHAIN-LINK FENCE SHALL BE IN ACCORDANCE WITH APPLICABLE PARTS OF SEC. 607.

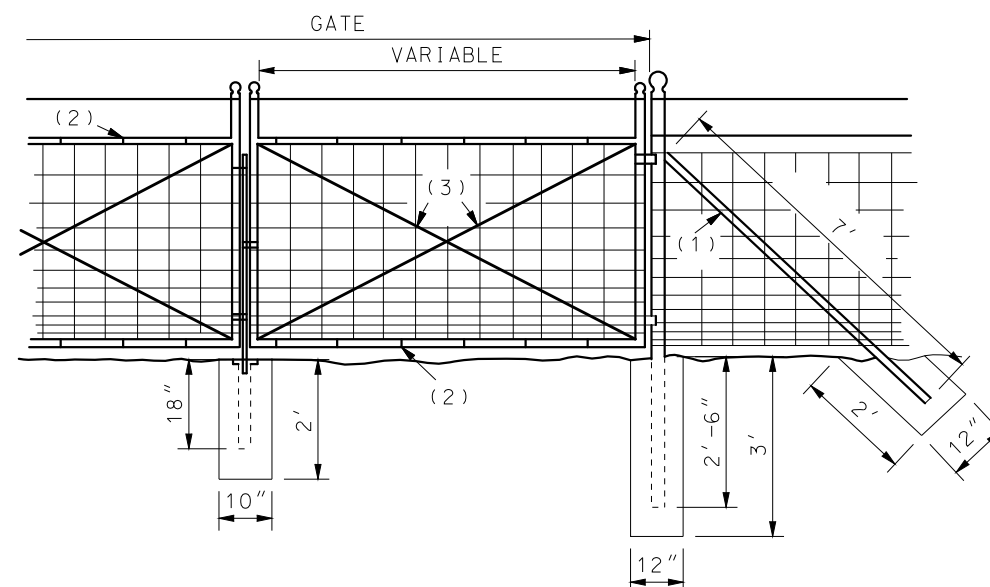
MAXIMUM POST SPACING IN HORIZONTAL DIRECTION SHALL BE 10'-0".

| | | |
|--|---|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | CHAIN-LINK FENCE FOR RETAINING WALLS | |
| DATE EFFECTIVE: 06/01/2009 DATE PREPARED: 4/30/2009 | 607.11H | SHEET NO. 1 OF 1 |



TYPICAL FENCE LOCATION

| GATE OPENING | GATE POST SIZE | #/FT. |
|--------------|----------------|-------|
| ≤ 6' | 2" DIA. | 3.65 |
| ≤ 13' | 2 1/2" DIA. | 5.79 |
| ≤ 18' | 3 1/2" DIA. | 9.10 |
| > 18' | 6" DIA. | 18.97 |
| GATE FRAME | 1 1/2" DIA. | 2.72 |



- BRACES
- WIRE TIES
- 3.8" ADJUSTABLE TRUSS RODS.

GENERAL NOTES:

STEEL LINE POSTS SHALL BE OF AN APPROVED "U", "Y", "T" OR CHANNEL SECTION, NOTCHED OR STUDDED WITH AN ANCHOR PLATE. POST PUNCHED WITH HOLES OR SELF FASTENING LUGS WILL NOT BE PERMITTED.


STAPLES SHALL BE SCREW SHANK TYPE OR EQUIVALENT (1 1/4" MINIMUM LENGTH).

STRETCHED FABRIC AND BARBED WIRE ON OUTSIDE OF POST ON CORNERS AND CURVES.

ATTACHMENT OF FABRIC TO STEEL LINE POSTS IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATION.

GATES FOR WOVEN WIRE FENCE SHALL BE IN ACCORDANCE WITH SEC 607.20 AND 1043.3.6 OF THE STANDARD SPECIFICATIONS. EXCEPT THE FILLER SHALL BE WOVEN WIRE FABRIC OF THE SAME KIND AS USED FOR THE FENCE.

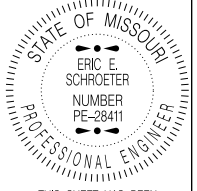
SINGLE LEAF GATES REQUIRE UP TO 12" OPENING. DOUBLE LEAF GATES REQUIRE OVER 12" OPENING. DIRECTION OF SWING OF GATES SHALL BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

WOVEN WIRE FENCE



THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

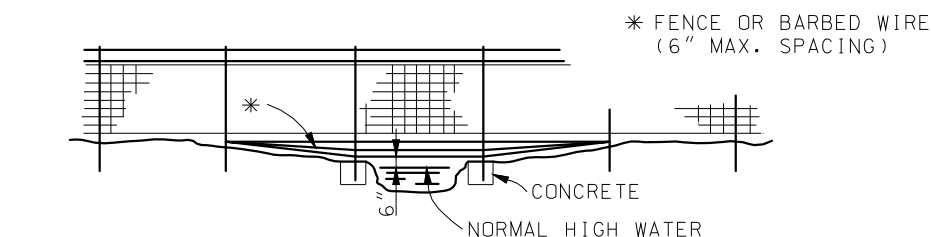
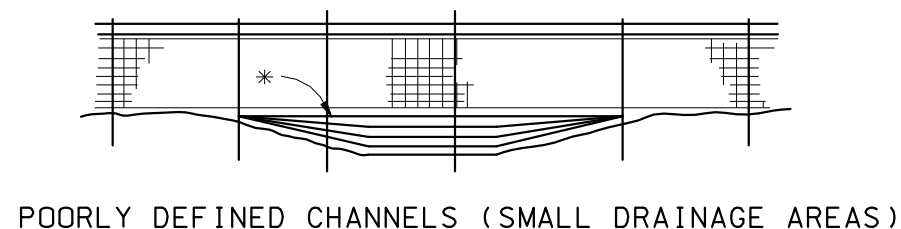
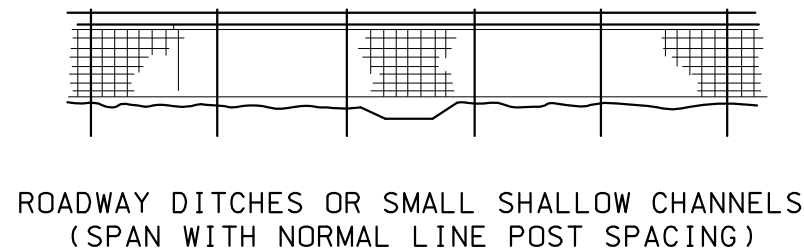
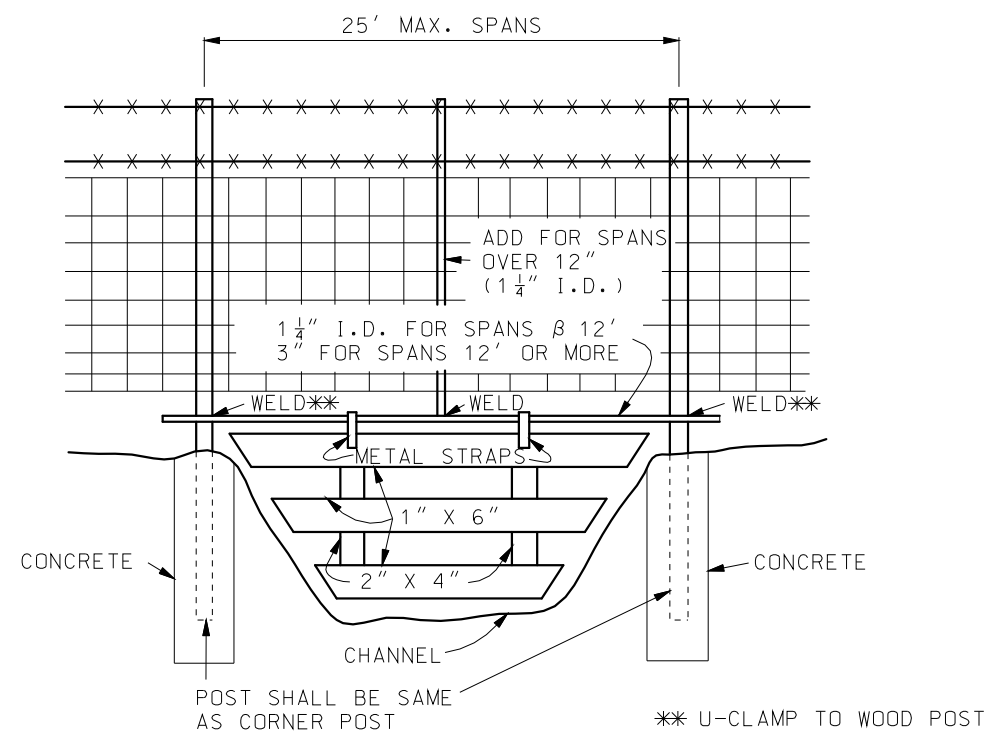
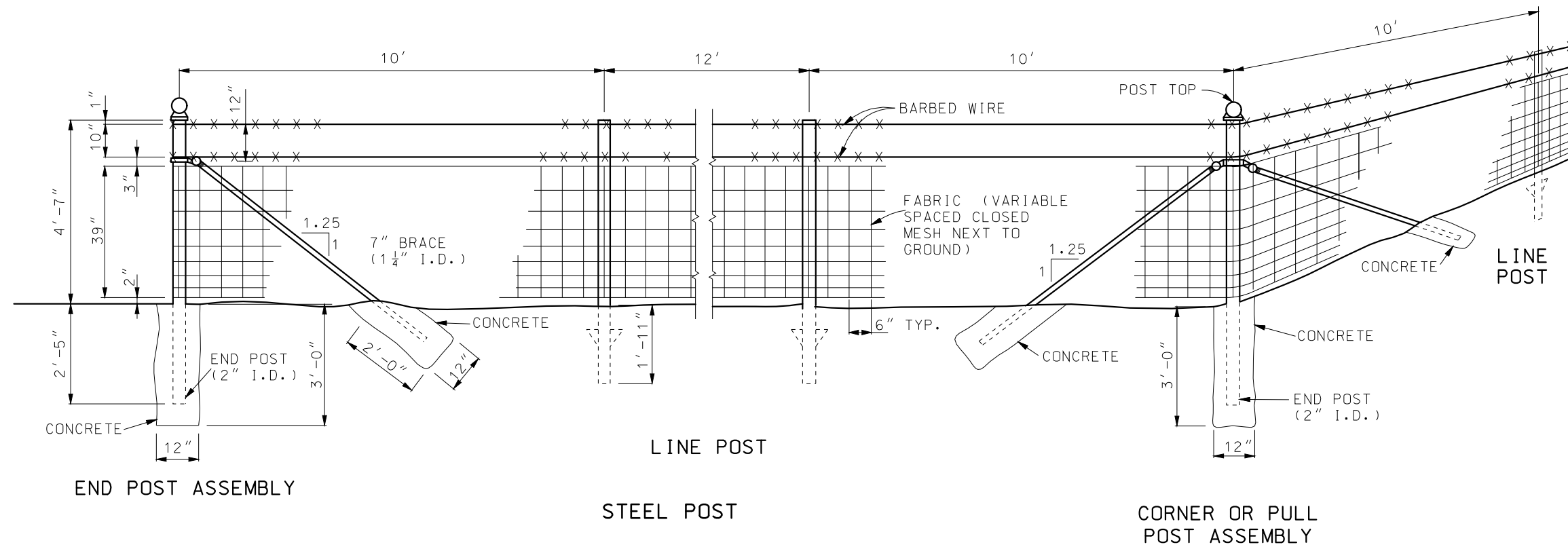
DATE EFFECTIVE: 07/01/2016

DATE PREPARED: 5/13/2016


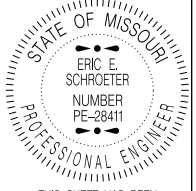
607.20G

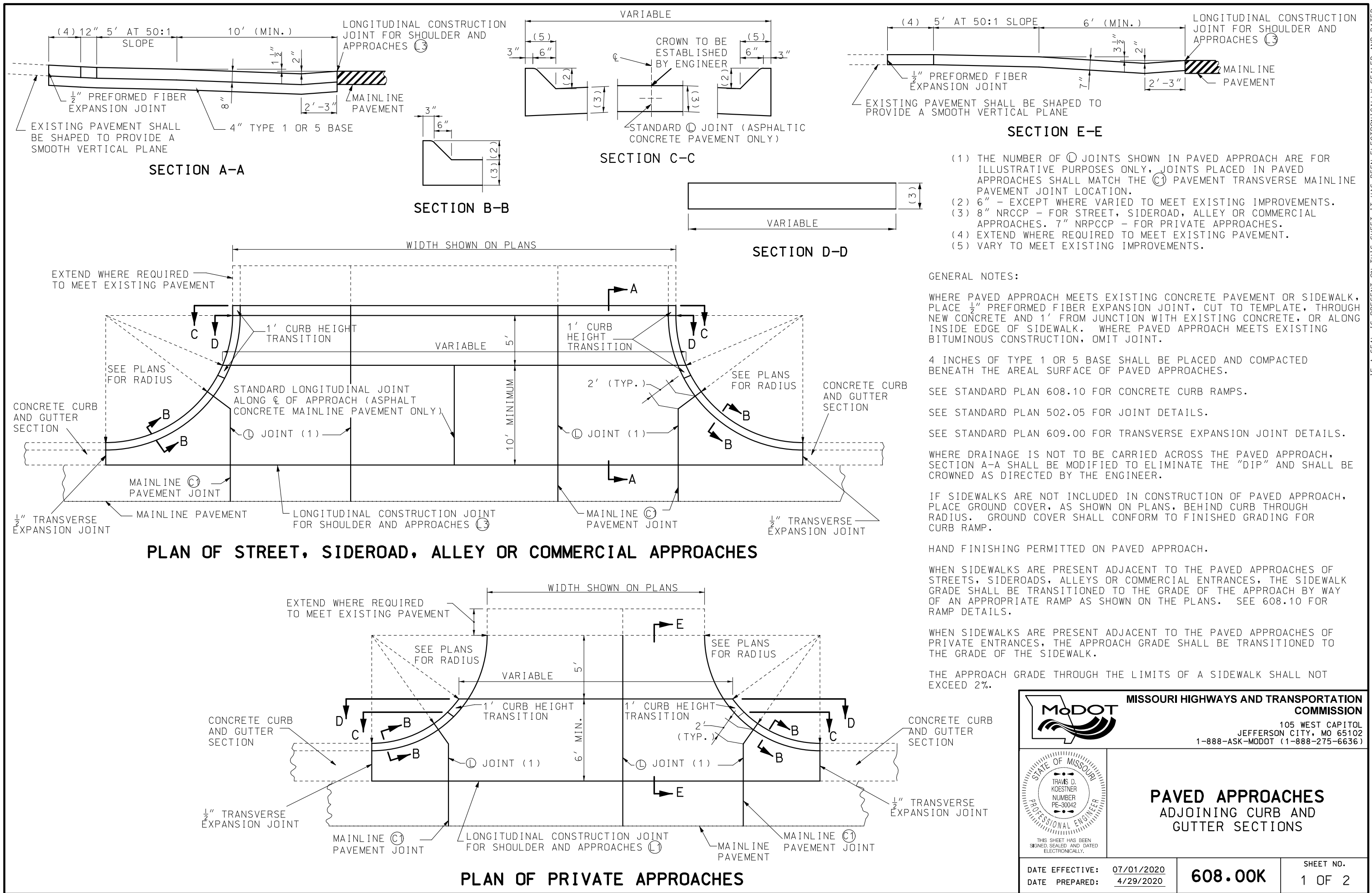
SHEET NO.
1 OF 2

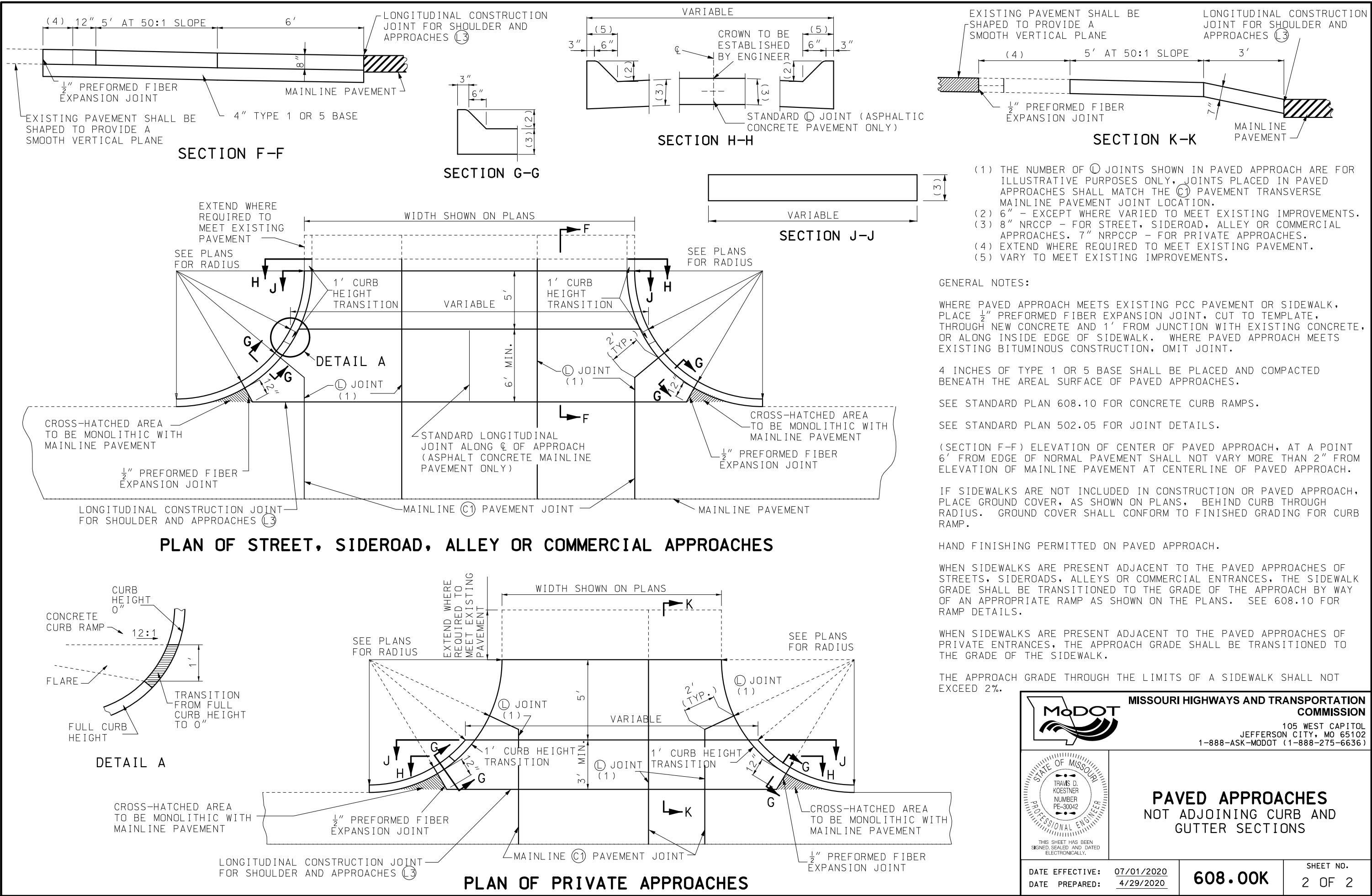
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.




TYPICAL FENCING AT
CHANNEL CROSSING

| | |
|--|---------------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | WOVEN WIRE FENCE |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | SHEET NO. 607.20G 2 OF 2 |



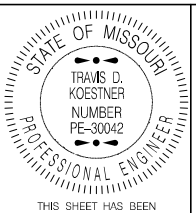


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

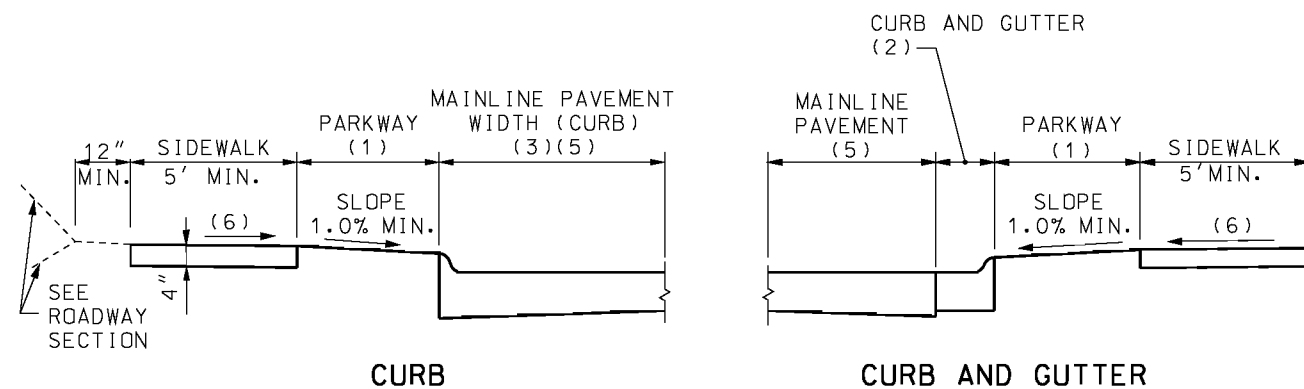
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



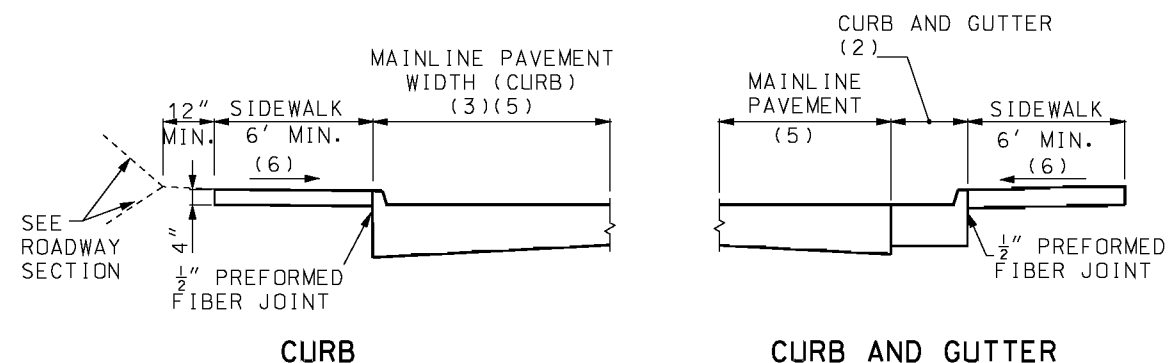
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

**PAVED APPROACHES
NOT ADJOINING CURB AND
GUTTER SECTIONS**

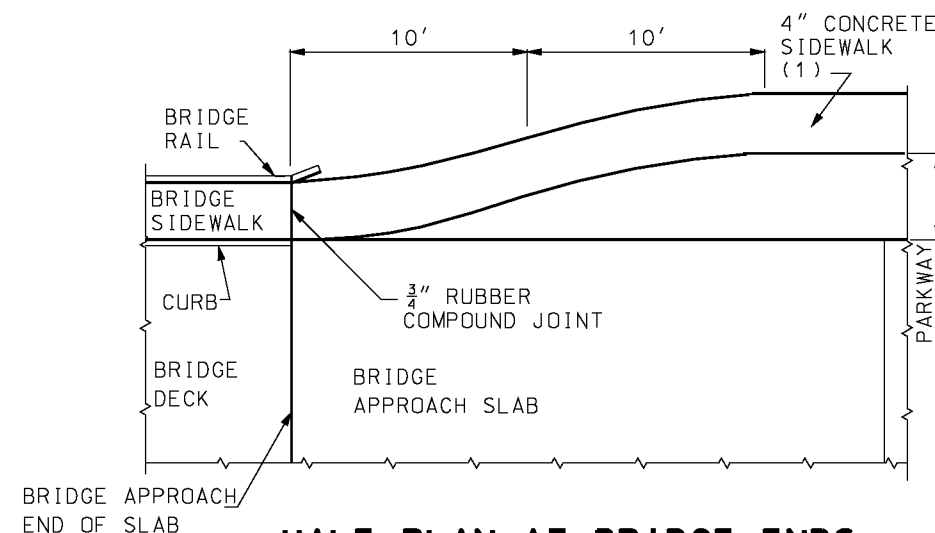
| | | |
|----------------------------|----------------|---------------------|
| DATE EFFECTIVE: 07/01/2020 | 608.00K | SHEET NO. 2 OF 2 |
| DATE PREPARED: 4/29/2020 | | |



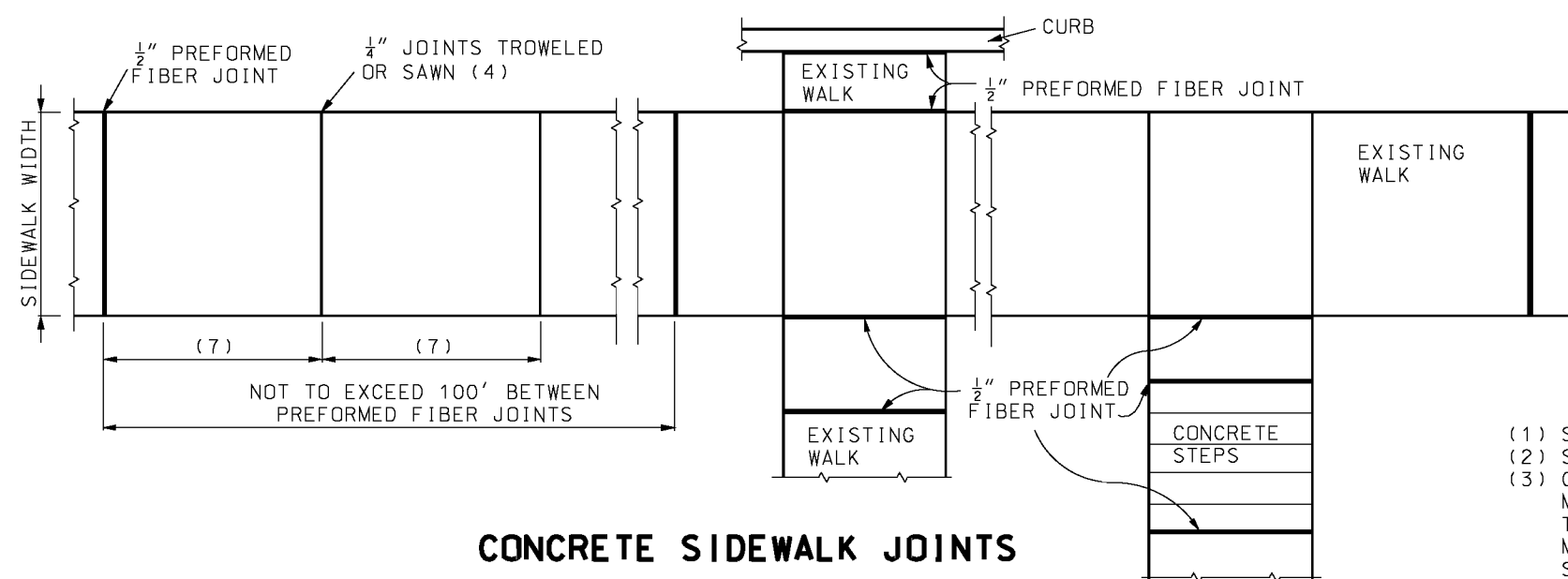
TYPICAL SIDEWALK WITH PARKWAY 2' OR MORE



TYPICAL SIDEWALK WITH NO PARKWAY



HALF PLAN AT BRIDGE ENDS



CONCRETE SIDEWALK JOINTS

- (1) SEE PLANS FOR WIDTH
- (2) SEE STANDARD 608.00
- (3) CURB TO BE MONOLITHIC WITH PCC MAINLINE PAVEMENT. CURB TO BE TYPE S WITH ASPHALT CONCRETE MAINLINE PAVEMENT. SEE STANDARD PLAN 609.00.
- (4) MIN. 1/2" DEPTH JOINT.
- (5) SEE TYPICAL PAVEMENT SECTION
- (6) SLOPE 1.0% (2.0% MAX.)
- (7) SPACING EQUAL TO WIDTH OF WALK

GENERAL NOTES:

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABILITIES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY. EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

WHERE SIDEWALKS ARE LESS THAN 5 FT., 5 FT. X 5 FT. PASSING SPACES EVERY 200 FT. SHALL BE PROVIDED AND ARE PERMITTED TO OVERLAP PEDESTRIAN ACCESS ROUTES.

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).


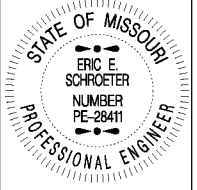
WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

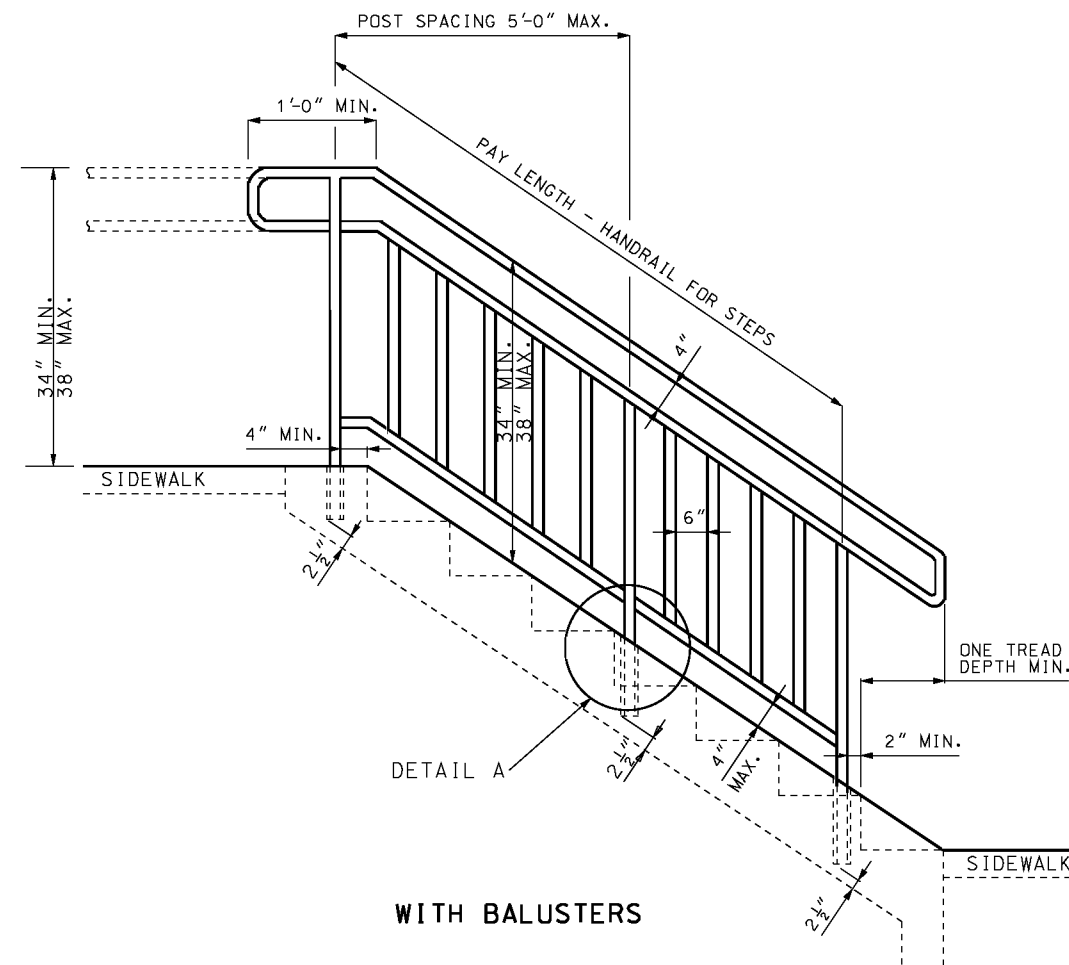
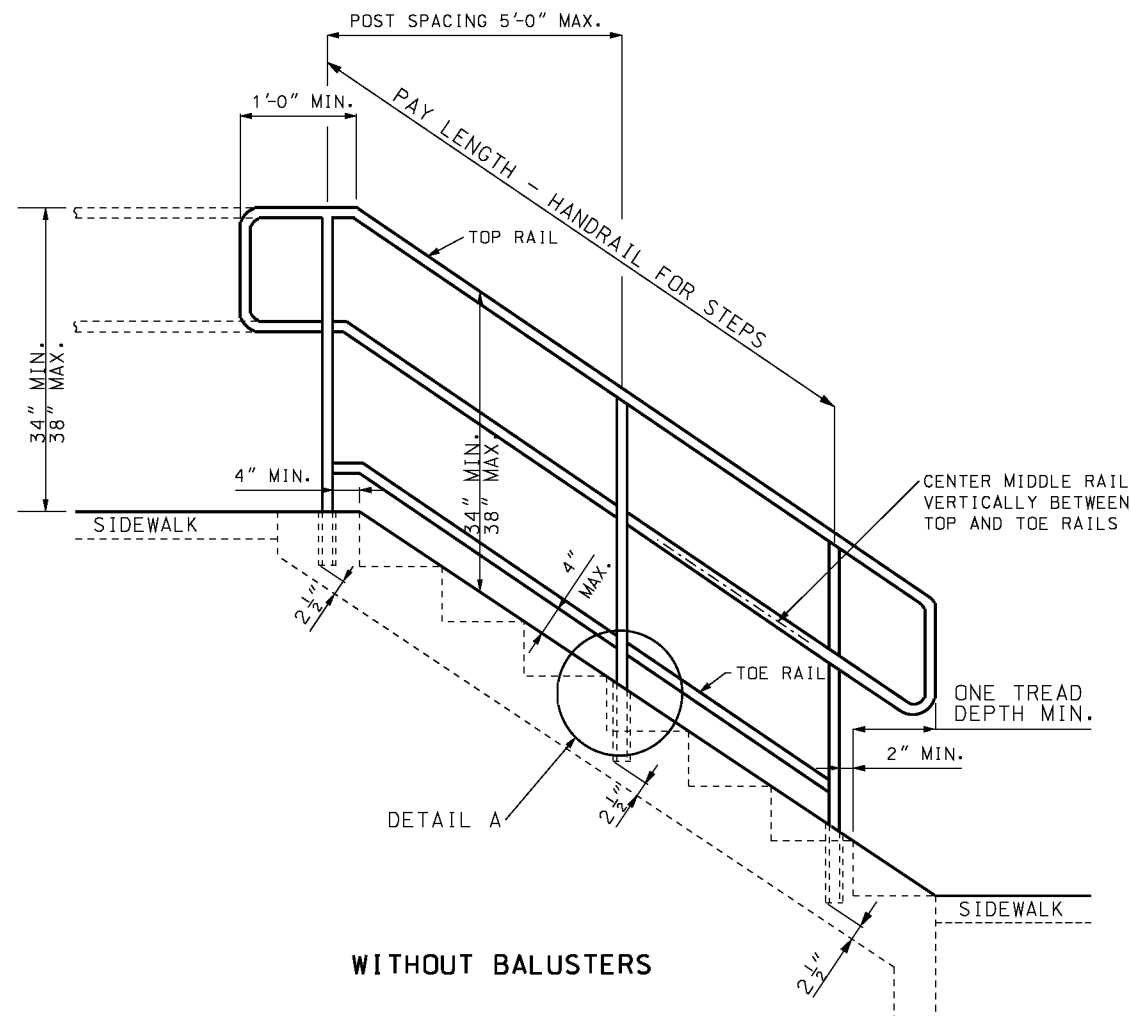
WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

STORMWATER INLETS, SIGNS, POSTS, MANHOLE COVERS, PULL BOXES AND OTHER ACCESS LIDS SHOULD BE AVOIDED WITHIN THE SIDEWALK. IF SUCH A LOCATION IS NECESSARY, THE FEATURE MUST MEET ADA STANDARDS.

THE RUNNING GRADE OF A SIDEWALK SHALL NOT EXCEED 5.0% UNLESS IT IS MATCHING THE GRADE OF THE ADJACENT ROADWAY.

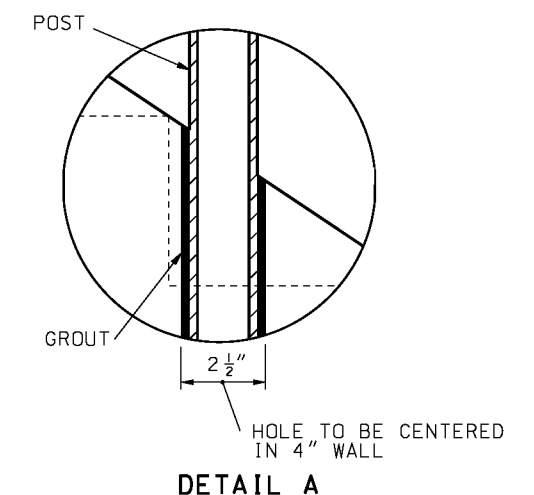
PEDESTRIAN ACCESS ROUTE SHALL CONTINUE ACROSS RESIDENTIAL AND COMMERCIAL ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS.

| | |
|--|--------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE SIDEWALK |
| DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 608.10P |
| SHEET NO. 1 OF 1 | |



| RAILING & POST SPECIFICATIONS | | | |
|-------------------------------|-------------|-------------------|-------|
| TYPE | SIZE (DIA.) | WEIGHT (LBS./FT.) | |
| | | ALUM. | STEEL |
| ROUND | 1 1/2" | 0.940 | 2.72 |
| SQUARE | 2" X 2" | 1.3094 | 4.31 |

| STEP DIMENSIONS | | | | |
|-----------------|---------|--------|----------|---------|
| SLOPE | TREAD | RISE | X | Y |
| 1:1.5 | 10 1/2" | 7" | 10 3/16" | 5 1/4" |
| 1:2 | 12" | 6" | 10 3/8" | 5 9/16" |
| 1:3 | 14 1/4" | 4 3/4" | 9 1/2" | 5 1/4" |



SAFETY RAIL DETAILS

GENERAL NOTES:

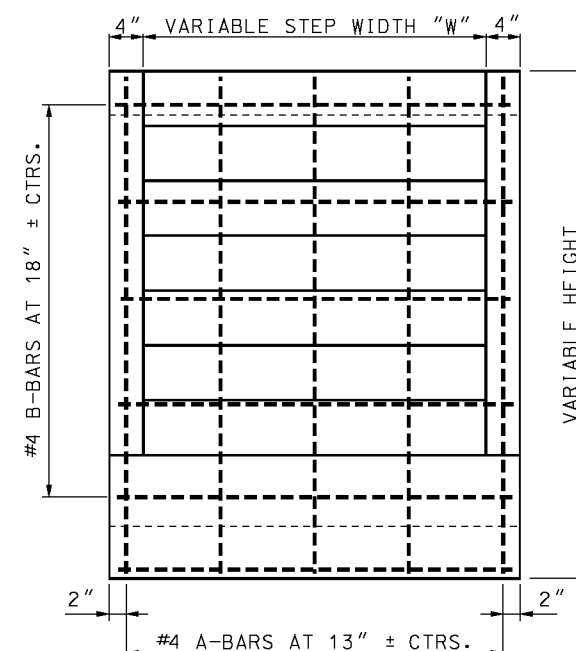
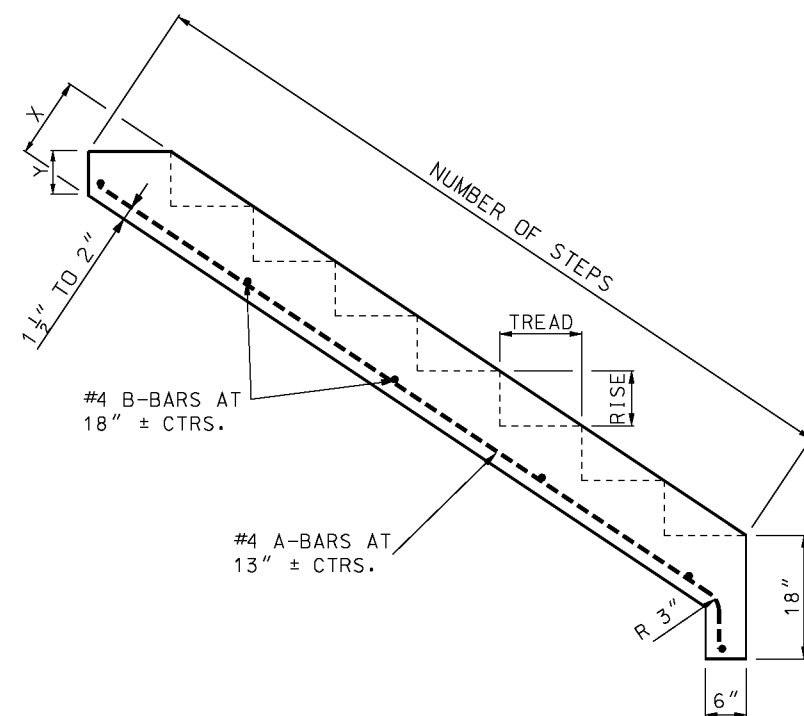
STAIRWAY SHALL HAVE SAFETY RAILS AT BOTH SIDES OF ALL STEPS.

RAILINGS AND POSTS MAY BE EITHER ROUND OR SQUARE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.



STEEL RAILINGS AND POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

ALL JOINTS SHALL BE CONTINUOUS WELDED AND GROUND SMOOTH.


ALL RAILING SHALL HAVE A 1/4" WEEP HOLE NEAR ALL INTERSECTING RAILING CONNECTIONS.



STAIRWAY STEP DETAILS

| | |
|--|------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE STAIRS |
| DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 608.20E |
| SHEET NO. 1 OF 2 | |

| QUANTITIES FOR CONCRETE STEPS | | | | | | | | | | | | | | |
|-------------------------------|-----------|------|------|------|-------------|------|------|------|------|-------------|------|------|------|------|
| CONCRETE C.Y. STEEL LB. | | | | | | | | | | | | | | |
| 10 1/2" TREAD | | | | | 1:1.5 SLOPE | | | | | 7" RISE | | | | |
| W | NO. STEPS | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2' | CONC. | 0.20 | 0.29 | 0.38 | 0.47 | 0.56 | 0.65 | 0.74 | 0.83 | 0.92 | 1.01 | 1.10 | 1.19 | 1.28 |
| | STEEL | 10 | 13 | 16 | 20 | 24 | 28 | 30 | 34 | 38 | 42 | 46 | 48 | 52 |
| 3' | CONC. | 0.27 | 0.39 | 0.51 | 0.63 | 0.75 | 0.88 | 1.00 | 1.12 | 1.24 | 1.36 | 1.48 | 1.60 | 1.73 |
| | STEEL | 13 | 18 | 21 | 27 | 32 | 38 | 41 | 46 | 52 | 57 | 63 | 65 | 71 |
| 4' | CONC. | 0.34 | 0.49 | 0.64 | 0.80 | 0.95 | 1.10 | 1.25 | 1.40 | 1.56 | 1.71 | 1.86 | 2.01 | 2.17 |
| | STEEL | 17 | 23 | 27 | 34 | 41 | 48 | 52 | 59 | 66 | 73 | 80 | 83 | 90 |
| 5' | CONC. | 0.41 | 0.59 | 0.78 | 0.96 | 1.14 | 1.33 | 1.51 | 1.69 | 1.88 | 2.06 | 2.24 | 2.42 | 2.61 |
| | STEEL | 21 | 28 | 33 | 42 | 50 | 59 | 63 | 71 | 80 | 88 | 97 | 101 | 109 |
| 6' | CONC. | 0.48 | 0.70 | 0.91 | 1.12 | 1.34 | 1.55 | 1.77 | 1.98 | 2.19 | 2.41 | 2.62 | 2.84 | 3.05 |
| | STEEL | 24 | 33 | 39 | 49 | 59 | 69 | 74 | 84 | 94 | 104 | 114 | 118 | 128 |
| 12" TREAD | | | | | 1:2 SLOPE | | | | | 6" RISE | | | | |
| W | NO. STEPS | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2' | CONC. | 0.18 | 0.26 | 0.33 | 0.41 | 0.49 | 0.56 | 0.64 | 0.72 | 0.80 | 0.87 | 0.95 | 1.03 | 1.10 |
| | STEEL | 10 | 12 | 16 | 19 | 23 | 25 | 29 | 33 | 36 | 39 | 42 | 46 | 50 |
| 3' | CONC. | 0.25 | 0.35 | 0.45 | 0.56 | 0.66 | 0.76 | 0.87 | 0.97 | 1.07 | 1.18 | 1.28 | 1.38 | 1.49 |
| | STEEL | 13 | 16 | 21 | 26 | 32 | 34 | 39 | 45 | 50 | 53 | 58 | 63 | 68 |
| 4' | CONC. | 0.31 | 0.44 | 0.57 | 0.70 | 0.83 | 0.96 | 1.09 | 1.22 | 1.35 | 1.48 | 1.61 | 1.74 | 1.87 |
| | STEEL | 17 | 20 | 27 | 33 | 40 | 44 | 50 | 57 | 63 | 67 | 73 | 81 | 87 |
| 5' | CONC. | 0.38 | 0.53 | 0.69 | 0.85 | 1.00 | 1.16 | 1.31 | 1.47 | 1.63 | 1.78 | 1.94 | 2.10 | 2.25 |
| | STEEL | 21 | 25 | 33 | 41 | 49 | 53 | 61 | 69 | 77 | 82 | 89 | 98 | 105 |
| 6' | CONC. | 0.44 | 0.62 | 0.81 | 0.99 | 1.17 | 1.36 | 1.54 | 1.72 | 1.90 | 2.09 | 2.27 | 2.45 | 2.64 |
| | STEEL | 24 | 29 | 39 | 48 | 58 | 62 | 71 | 81 | 90 | 96 | 105 | 115 | 124 |
| 14 1/4" TREAD | | | | | 1:3 SLOPE | | | | | 4 3/4" RISE | | | | |
| W | NO. STEPS | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2' | CONC. | 0.19 | 0.27 | 0.35 | 0.43 | 0.51 | 0.59 | 0.68 | 0.76 | 0.84 | 0.92 | 1.00 | 1.08 | 1.16 |
| | STEEL | 10 | 14 | 18 | 21 | 25 | 29 | 33 | 37 | 41 | 43 | 47 | 51 | 55 |
| 3' | CONC. | 0.26 | 0.37 | 0.48 | 0.59 | 0.70 | 0.80 | 0.91 | 1.02 | 1.13 | 1.24 | 1.35 | 1.46 | 1.56 |
| | STEEL | 14 | 19 | 25 | 28 | 34 | 39 | 45 | 50 | 56 | 59 | 65 | 70 | 76 |
| 4' | CONC. | 0.33 | 0.47 | 0.61 | 0.74 | 0.88 | 1.02 | 1.15 | 1.29 | 1.42 | 1.56 | 1.70 | 1.83 | 1.97 |
| | STEEL | 18 | 25 | 32 | 36 | 43 | 50 | 57 | 64 | 71 | 75 | 82 | 89 | 96 |
| 5' | CONC. | 0.40 | 0.57 | 0.73 | 0.90 | 1.06 | 1.22 | 1.39 | 1.55 | 1.72 | 1.88 | 2.05 | 2.21 | 2.38 |
| | STEEL | 22 | 30 | 39 | 44 | 52 | 61 | 69 | 78 | 86 | 91 | 100 | 108 | 117 |
| 6' | CONC. | 0.47 | 0.66 | 0.86 | 1.05 | 1.24 | 1.43 | 1.63 | 1.82 | 2.01 | 2.21 | 2.40 | 2.59 | 2.78 |
| | STEEL | 25 | 35 | 45 | 51 | 61 | 71 | 81 | 91 | 101 | 107 | 117 | 127 | 137 |



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER PE-28411

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 04/01/2015

DATE PREPARED: 2/20/2015

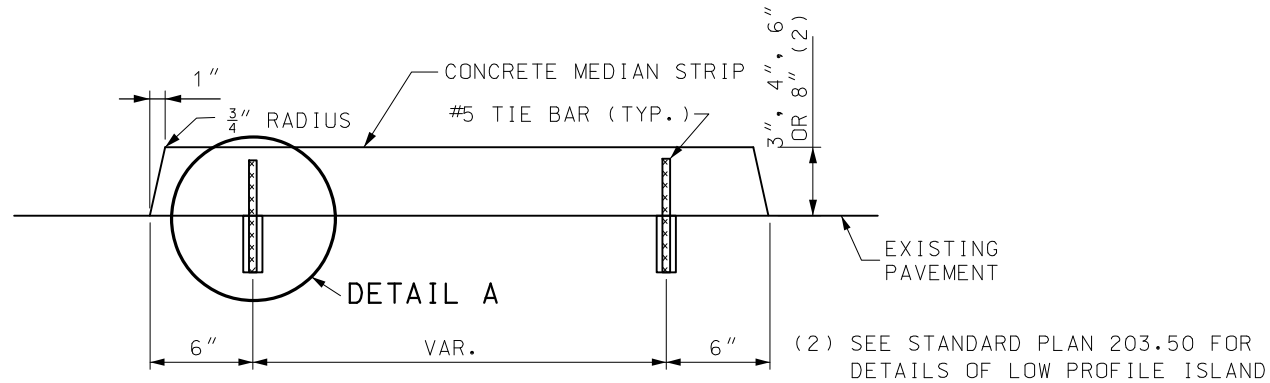
608.20E

SHEET NO.

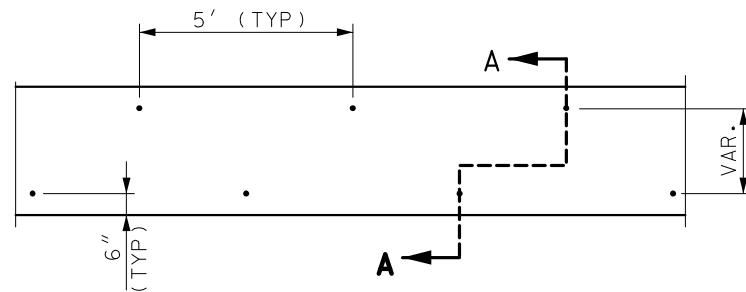
2 OF 2

CONCRETE STAIRS

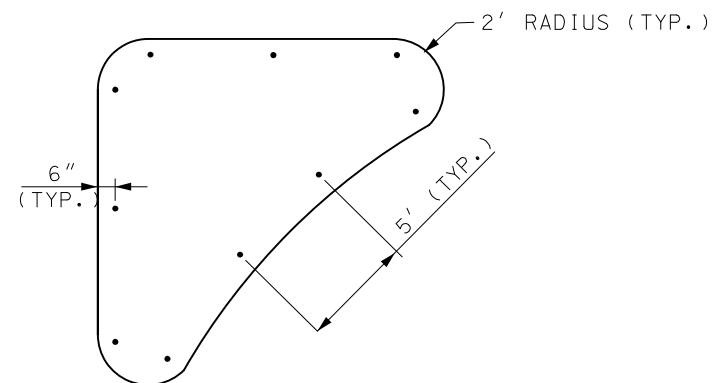
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



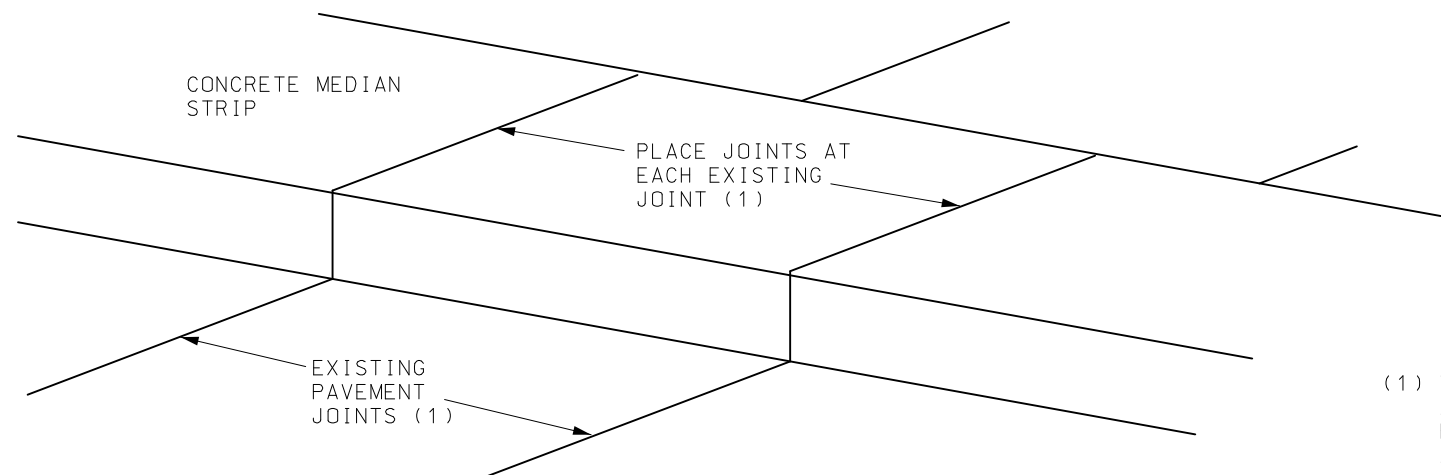
SECTION A-A
CONCRETE MEDIAN STRIP



TIE BAR LOCATIONS FOR
CONCRETE MEDIAN STRIP

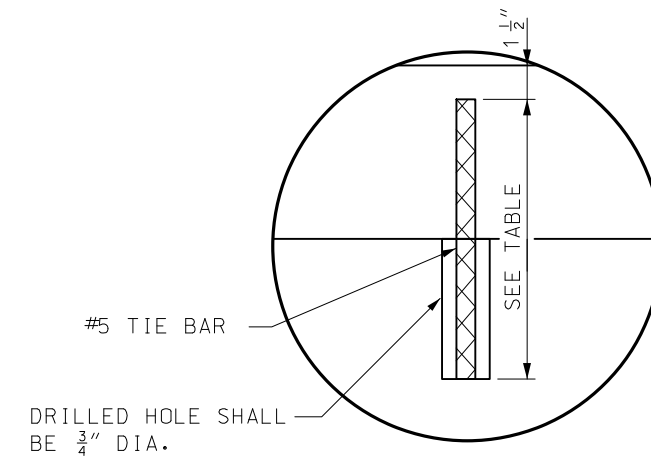


TIE BAR LOCATIONS FOR
CONCRETE MEDIAN STRIP (ISLAND)



CONCRETE MEDIAN STRIP JOINT LOCATION

(1) WHEN THERE ARE NO VISIBLE JOINTS IN THE ADJACENT PAVEMENT, THE JOINT SPACING WILL BE EQUAL TO THE MEDIAN STRIP WIDTH, WITH A MINIMUM SPACING OF 10'.



DETAIL A

| MEDIAN HEIGHT | BAR LENGTH |
|---------------|------------|
| 3" | 8" |
| 4" | 9" |
| 6" | 11" |
| 8" | 13" |


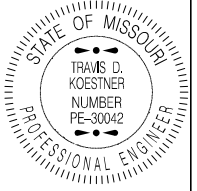
GENERAL NOTES:

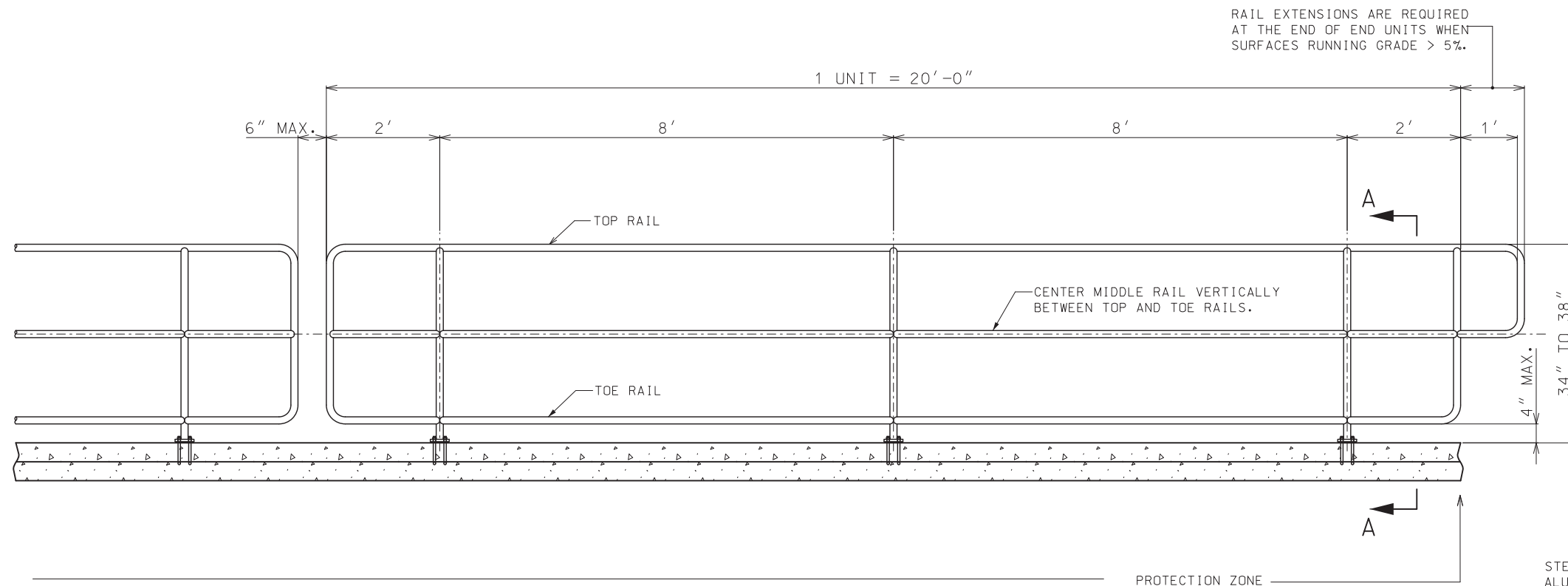
TIE BARS SHALL BE EPOXY COATED, DEFORMED REINFORCING BARS MEETING THE REQUIREMENTS OF SECTION 710 AND 1057.

BONDING FOR TIE BARS SHALL BE EPOXY OR POLYESTER BONDING AGENTS AS SPECIFIED IN SECTION 1039.

THE FACE OF THE MEDIAN MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6' OR LESS.

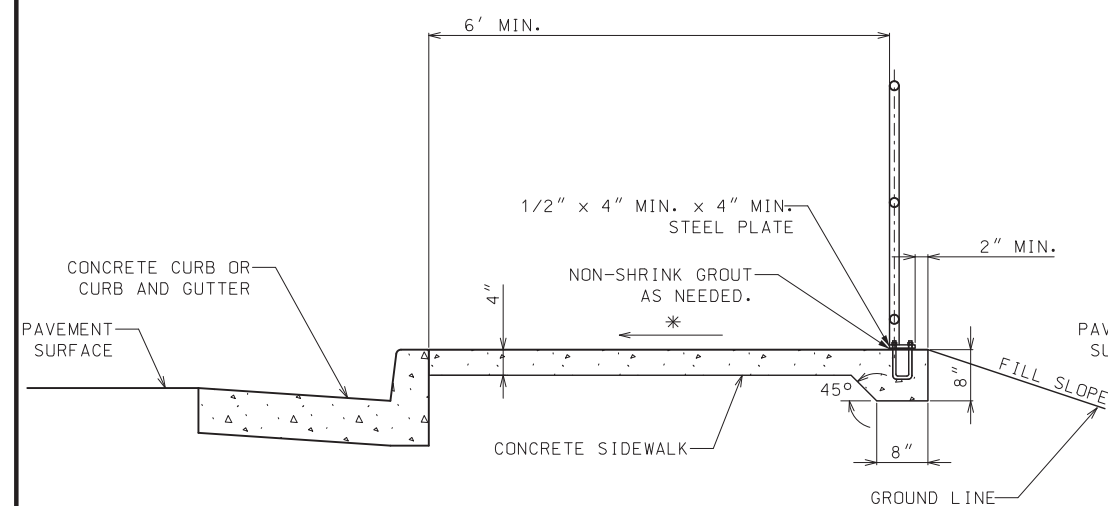
WHEN CONCRETE MEDIANS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, THE MEDIAN HEIGHT WILL BE 4".

| | |
|--|-------------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>CONCRETE MEDIAN STRIP</p> |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | <p>608.30A</p> |
| SHEET NO. 1 OF 1 | |

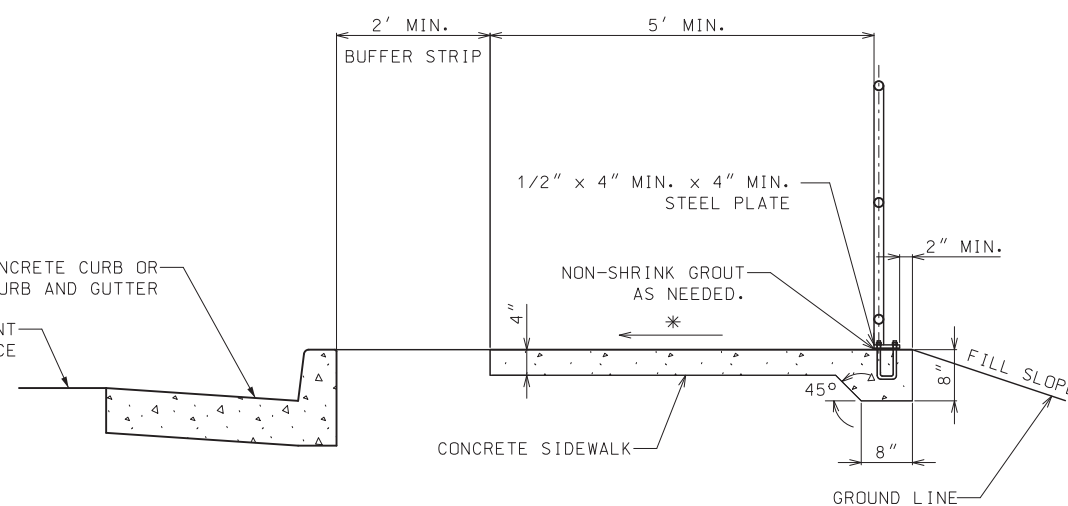


SIDEWALK HANDRAILING WITHOUT BALUSTERS

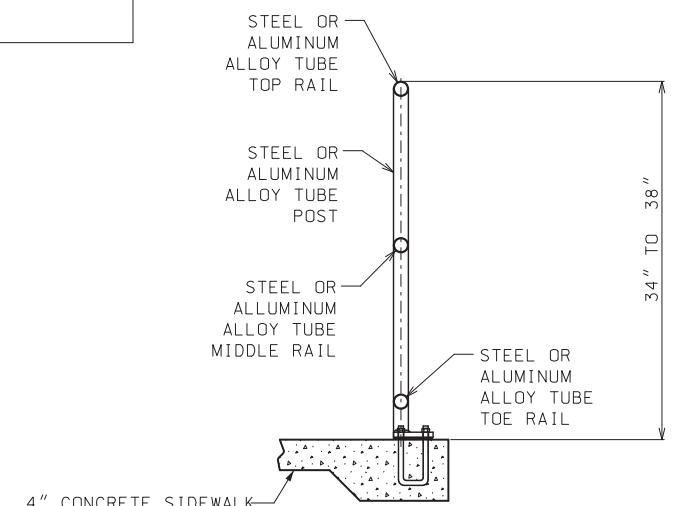
* CROSS SLOPE: 1.0 % MIN. - 2.0 % MAX.



SIDEWALK WITHOUT BUFFER STRIP
(SECTION A-A)



SIDEWALK WITH BUFFER STRIP
(SECTION A-A)

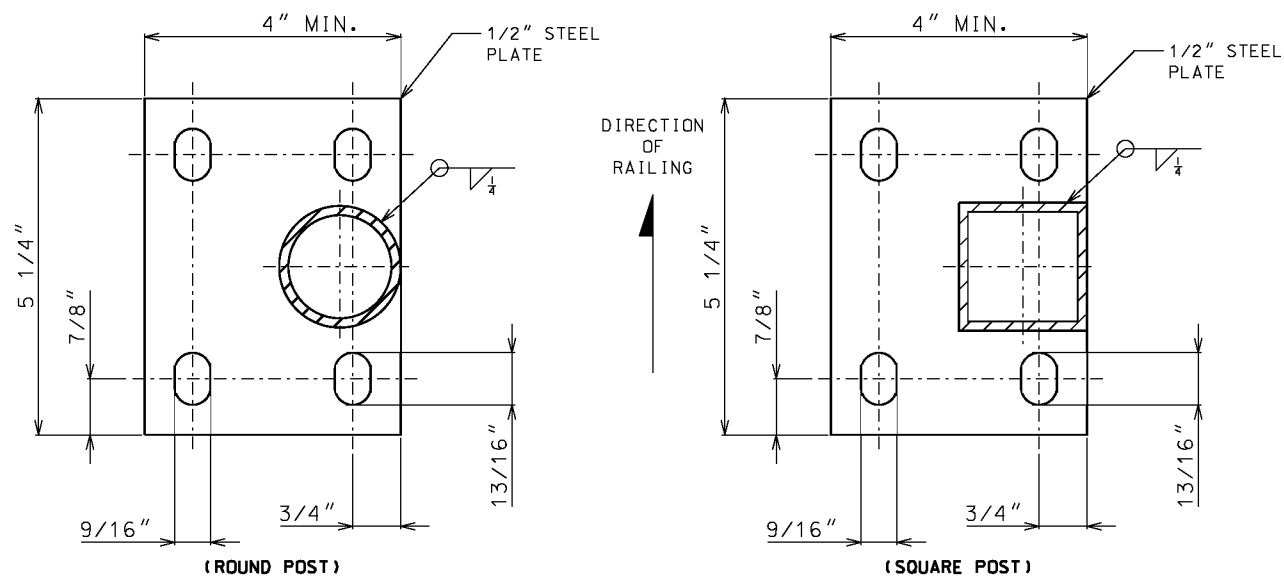


HANDRAILING

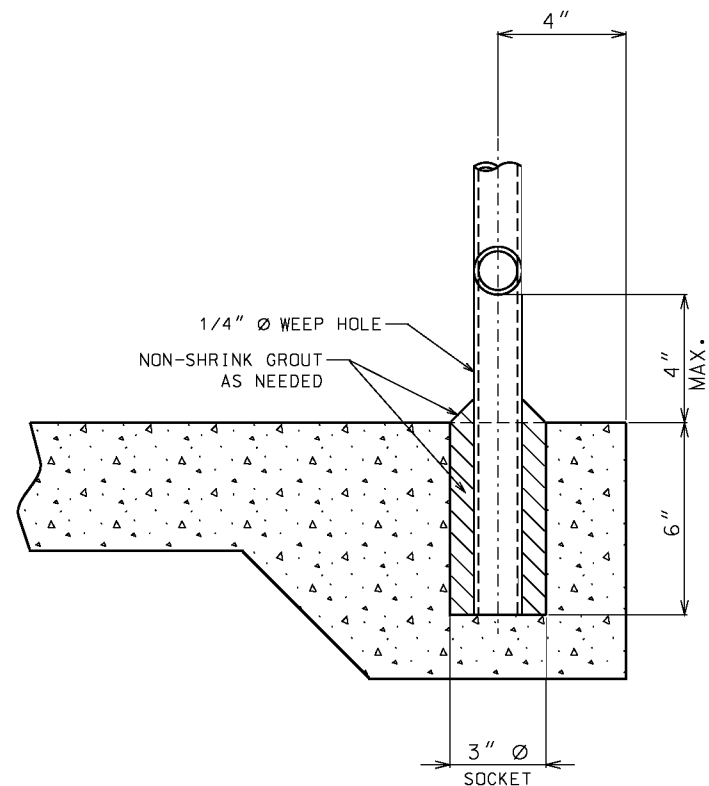
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|--|--------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | HANDRAILING |
| DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018 | 608.40 |
| SHEET NO. 1 OF 4 | |

FOR GENERAL NOTES AND HANDRAILING REQUIREMENTS ON FILL SLOPES SEE SHEET 3 OF 4

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**MOUNTING PLATE DETAIL
(PLAN VIEW)**



SOCKET MOUNTING DETAIL

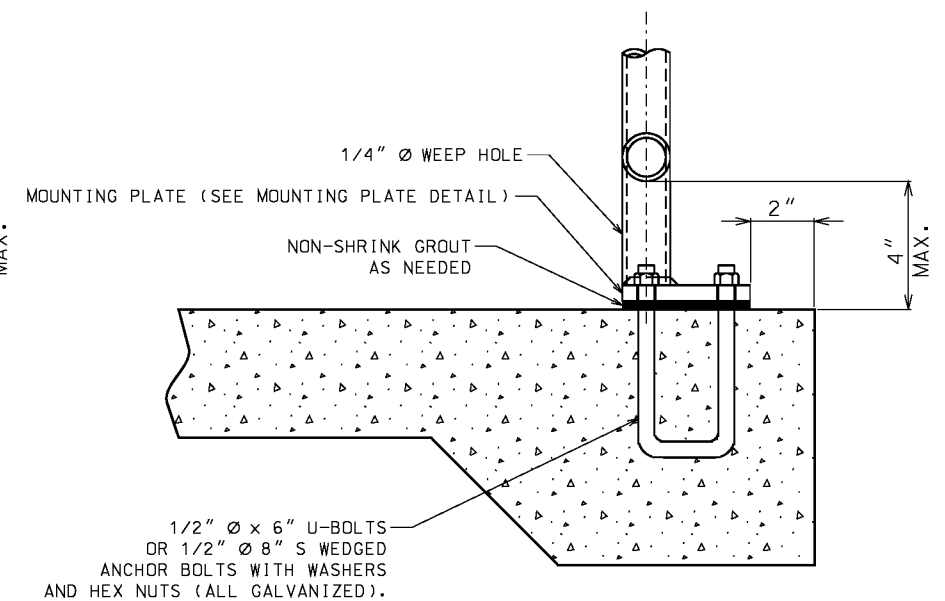


PLATE MOUNTING DETAIL

GENERAL NOTES:

RAILINGS AND POSTS MAY BE EITHER ROUND OR SQUARE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

STEEL RAILINGS AND POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

ALL JOINTS SHALL BE CONTINUOUS WELDED AND GROUND SMOOTH.

METAL SAFETY RAIL MUST BE COMPLIANT WITH THE "AMERICAN'S WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG)". EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

ALL POSTS SHALL HAVE A 1/4" WEEP HOLE IMMEDIATELY ABOVE THE MOUNTING PLATE.

WHEN INSTALLED THE POSTS SHALL BE PLUMB AND RAILINGS SHALL MATCH THE SLOPE OF THE SIDEWALK.

| HANDRAIL REQUIREMENTS | | |
|-----------------------|-------------|--------------|
| FILL SLOPE | FILL HEIGHT | HANDRAIL |
| (1V:3H) OR FLATTER | — | NOT REQUIRED |
| (1V:3H) OR STEEPER | ≥ 6 FT. | REQUIRED |
| (1V:2H) OR STEEPER | ≥ 4 FT. | REQUIRED |
| (1V:1H) OR STEEPER | ≥ 1 FT. | REQUIRED |

| RAILING AND POST SPECIFICATION | | | | |
|--------------------------------|--------|-------------------|------------------------|--------|
| DESCRIPTION | TYPE | SIZE (DIA.) | WEIGHT (LBS. / FT.) | |
| | | | ALUM. | STEEL |
| RAILING & POST | ROUND | 1 1/2" | 0.940 | 2.720 |
| | SQUARE | 2" X 2" | 1.3094 | 4.310 |
| BALUSTER | ROUND | 1/2" | 0.2312 | 0.668 |
| | RECT. | 3/8" X 1/2" STL. | — | 0.6375 |
| | SQUARE | 1/2" X 1/2" ALUM. | 0.2944 | — |

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

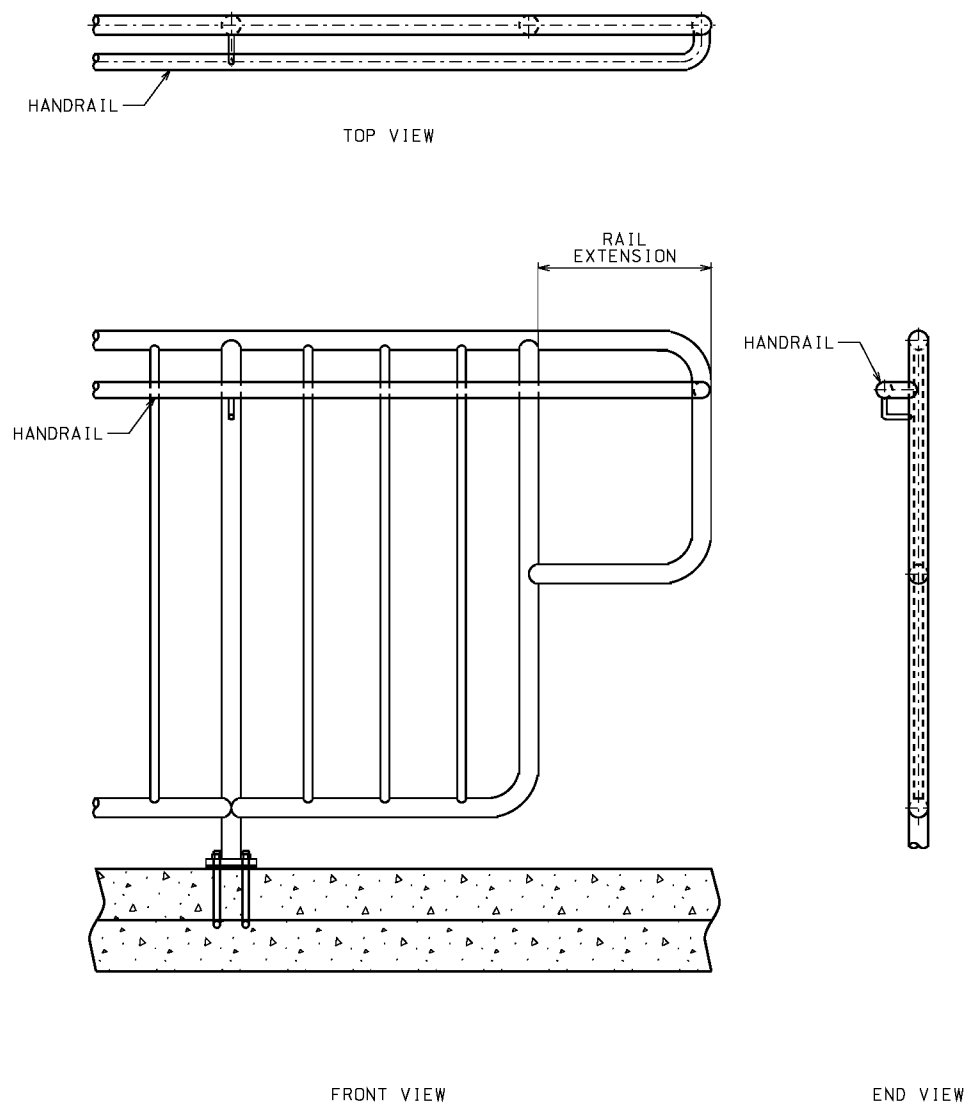
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

HANDRAILING

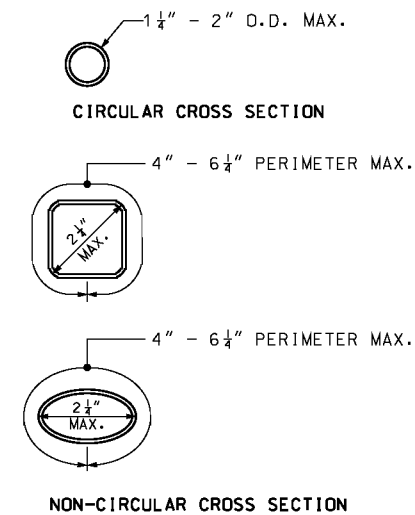
DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

608.40

SHEET NO.
3 OF 4



HANDRAIL AND EXTENSION CONNECTION



HANDRAIL GRIPPING SURFACES

HANDRAIL NOTES:

HANDRAILS SHALL BE STEEL OF GOOD COMMERCIAL WELDABLE QUALITY OR ALUMINUM ALLOY 6061-T6 OR 6063-T6.

HANDRAILS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

HANDRAILS SHALL BE AT A CONSISTENT HEIGHT ABOVE WALKING SURFACES.

HANDRAIL GRIPPING SURFACES SHALL BE CONTINUOUS ALONG THEIR LENGTH AND SHALL NOT BE OBSTRUCTED ALONG THEIR TOPS OR SIDES.

THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL NOT BE OBSTRUCTED FOR MORE THAN 20 PERCENT OF THEIR LENGTH.



WHERE HANDRAILS ARE PROVIDED ALONG WALKING SURFACES WITH SLOPES NOT STEEPER THAN 1:20, THE BOTTOMS OF HANDRAIL GRIPPING SURFACES SHALL BE PERMITTED TO BE OBSTRUCTED ALONG THEIR ENTIRE LENGTH WHERE THEY ARE INTEGRAL TO CRASH RAILS OR BUMPER GUARDS.

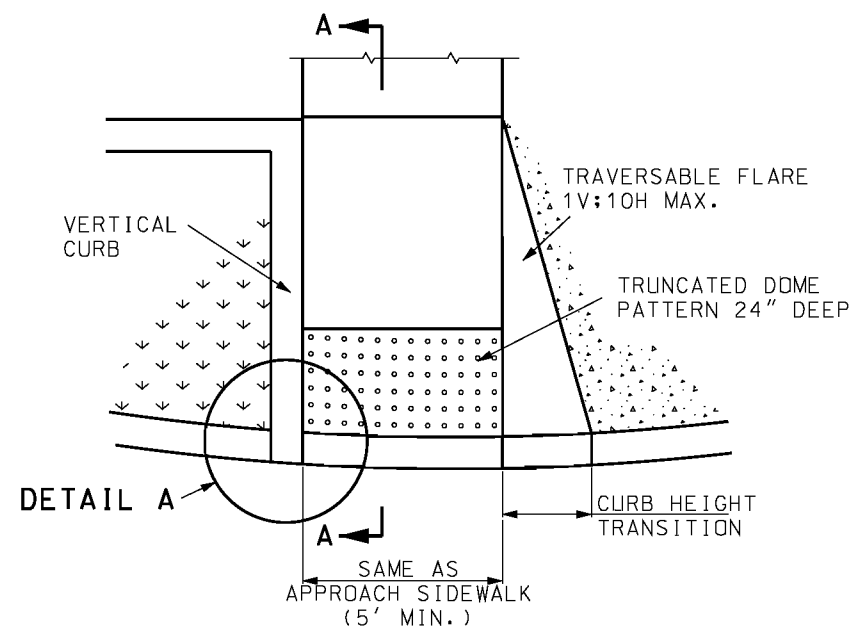
THE DISTANCE BETWEEN HORIZONTAL PROJECTIONS AND THE BOTTOM OF THE GRIPPING SURFACE SHALL BE PERMITTED TO BE REDUCED BY $\frac{1}{8}$ " FOR EACH $\frac{1}{2}$ " OF ADDITIONAL HANDRAIL PERIMETER DIMENSION THAT EXCEEDS 4".

HANDRAIL SURFACES AND ANY SURFACES ADJACENT TO THEM SHALL BE FREE OF SHARP OR ABRASIVE ELEMENTS AND SHALL HAVE ROUNDED EDGES.

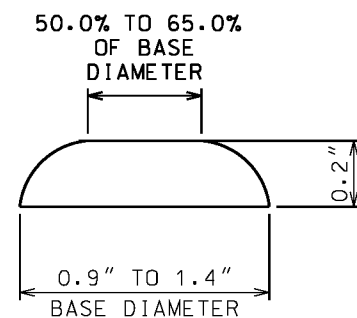
HANDRAILS SHALL NOT ROTATE WITHIN THEIR FITTINGS.

DETAIL A - HANDRAIL

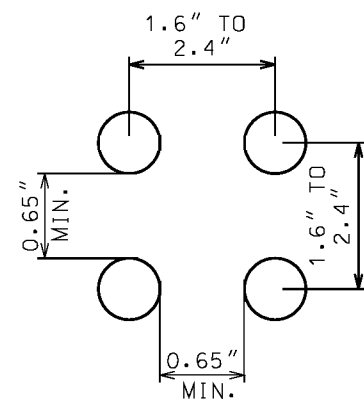
| | | |
|--|--------------------|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small> | HANDRAILING | |
| DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 608.40 | SHEET NO. 4 OF 4 |



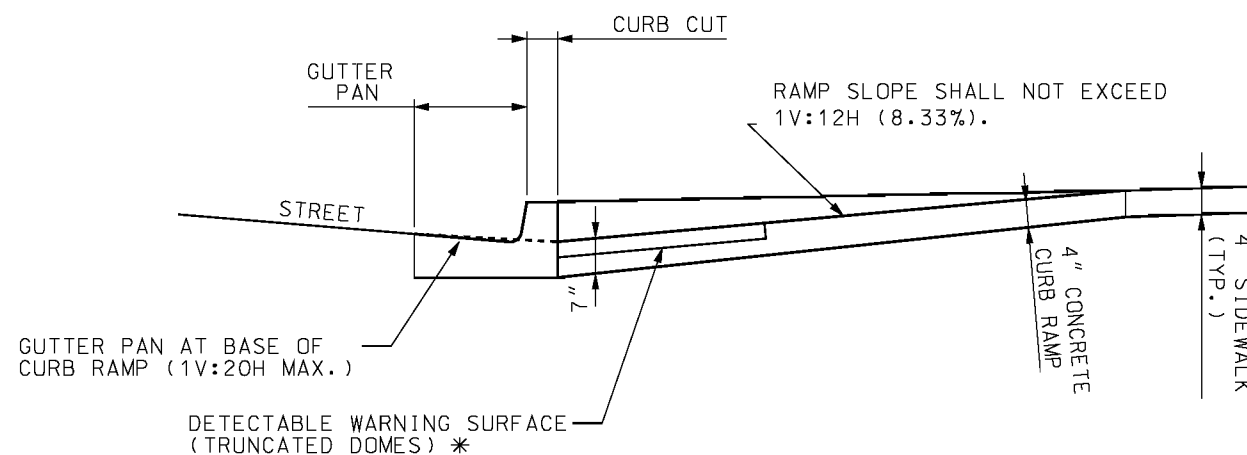
CURB RAMP DETAIL



TRUNCATED DOMES CROSS SECTION

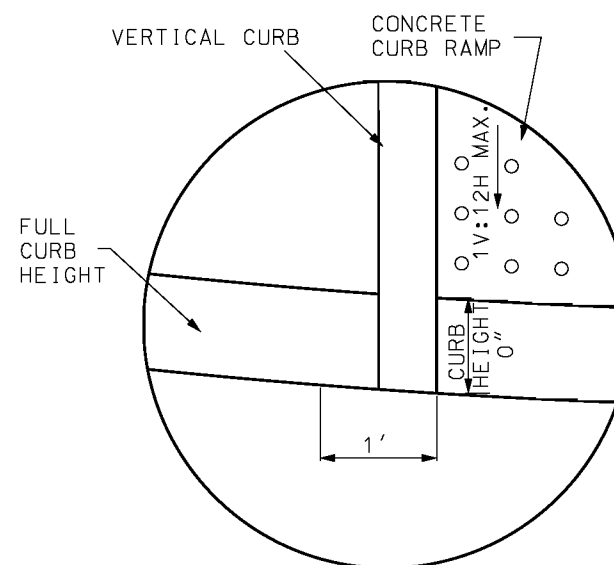


TRUNCATED DOMES SPACING



SECTION A-A

* SOME DETECTABLE WARNING PRODUCTS REQUIRE A CONCRETE BORDER FOR PROPER INSTALLATION. THE CONCRETE BORDER SHALL NOT EXCEED 2 INCH PER SIDE.



DETAIL A

GENERAL NOTES:

ALL AREAS OF THE PEDESTRIAN ACCESS ROUTE MUST BE COMPLIANT WITH THE AMERICANS WITH DISABILITIES ACT - GUIDELINES FOR ACCESSIBLE PUBLIC RIGHTS OF WAY. EXCEPTIONS MUST BE APPROVED BY THE ENGINEER. ALL OTHER AREAS OF NON-COMPLIANCE SHALL BE REMOVED AND CORRECTED AT THE CONTRACTOR'S EXPENSE.

THE SURFACES OF PEDESTRIAN ACCESS ROUTES AND ELEMENTS, AND SPACES REQUIRED TO CONNECT TO PEDESTRIAN ACCESS ROUTES, SHALL BE FIRM, STABLE, SLIP RESISTANT, AND SHALL NOT POND WATER.

SIDEWALK, RAMP AND LANDING CROSS SLOPES SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

THE CROSS SLOPE OF THE CONTINUOUS PEDESTRIAN ACCESS ROUTE THROUGH ENTRANCES, ALLEYS, AND SIDEROAD CONNECTIONS WITH STOP OR YIELD CONTROL SHALL BE 1.00% TO FACILITATE DRAINAGE (2.00% MAX.).

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE 5.00% MAXIMUM.

WHERE PEDESTRIAN ACCESS ROUTES ARE CONTAINED WITHIN MIDBLOCK PEDESTRIAN STREET CROSSINGS, THE CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE SHALL BE PERMITTED TO EQUAL THE STREET OR HIGHWAY GRADE.

30"x 48" CLEAR SPACE SHALL BE PROVIDED CENTERED ON THE PEDESTRIAN PUSH BUTTON.

BEYOND THE BOTTOM GRADE BREAK OF A CURB RAMP, A CLEAR SPACE 4' MINIMUM BY 4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.

SIDE FLARES OF CURB RAMP, IN THE PATH OF PEDESTRIAN TRAVEL (TRAVERSABLE), SHALL NOT EXCEED A SLOPE OF 1V:10H. SIDE FLARES OUTSIDE THE PEDESTRIAN PATH (NONTRAVERSABLE) MAY BE VERTICAL.


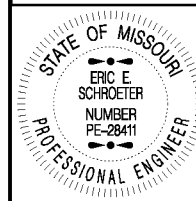
TRANSITION FROM SIDEWALK OR CURB RAMP TO GUTTER TO ROADWAY SHALL BE FLUSH.

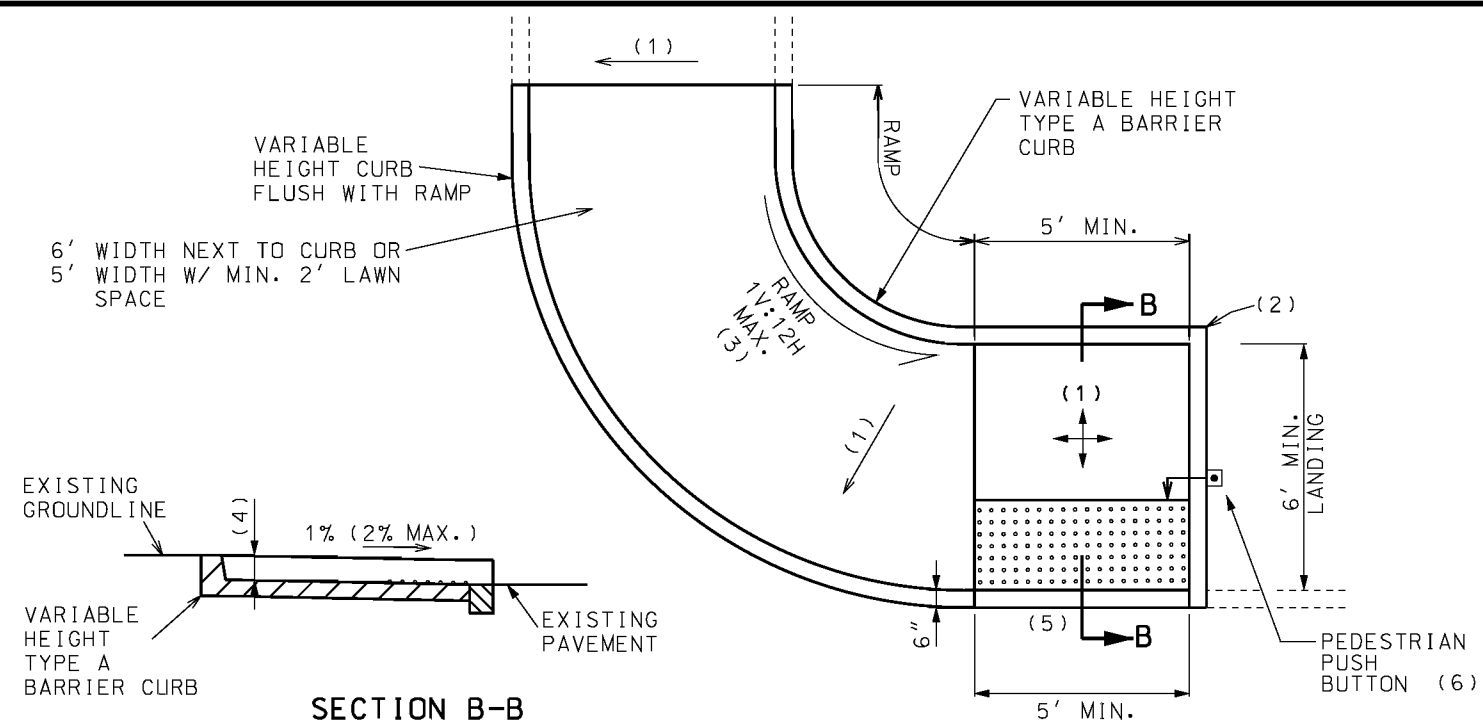
DETECTABLE WARNING SURFACES (TRUNCATED DOMES) SHALL BE PREFORMED AND INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS. STAMPED CONCRETE WILL NOT BE ACCEPTED.

THE DETECTABLE WARNING SURFACE SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES. EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT. TRUNCATED DOMES SHALL SPAN THE FULL WIDTH OF THE RAMP OR LANDING 24" DEEP.

DETECTABLE WARNING SURFACES SHALL BE ALIGNED PERPENDICULAR OR RADIAL TO THE BREAK BETWEEN THE RAMP, LANDING OR BLENDED TRANSITION, AND THE STREET.

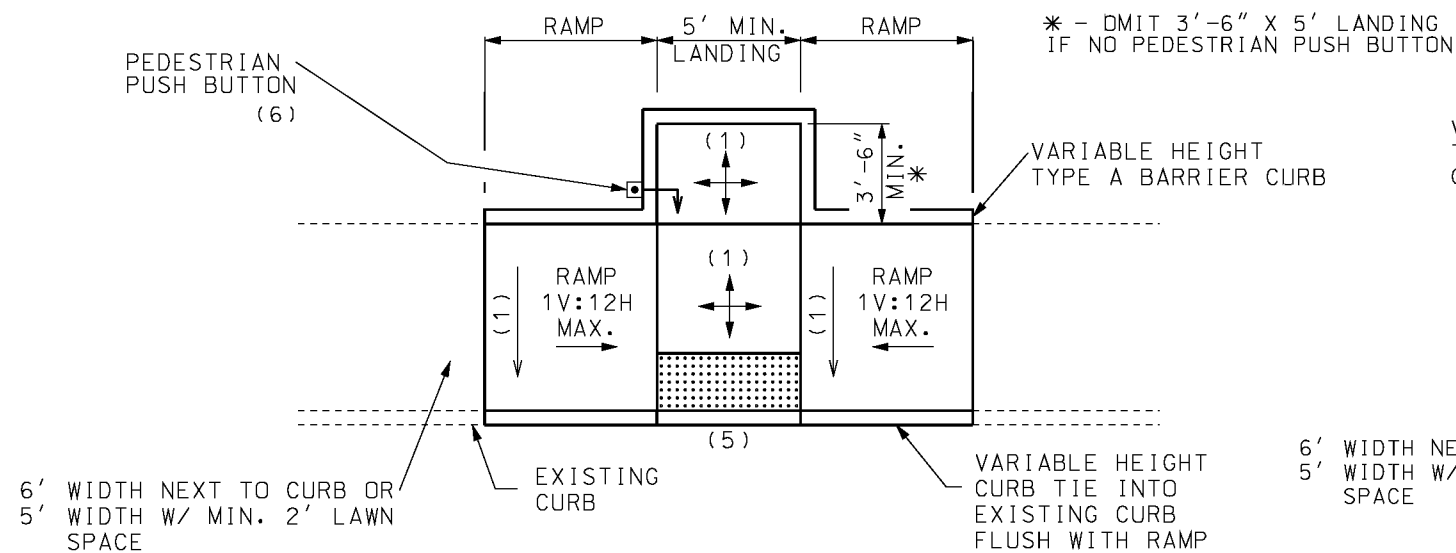
WHERE THE BOTTOM GRADE BREAK OF A CURB RAMP IS LESS THAN 5' FROM THE BACK OF CURB, DETECTABLE WARNINGS SHALL BE LOCATED ON THE RAMP SURFACE AT THE BACK OF THE CURB. WHERE THE GRADE BREAK IS GREATER THAN 5' FROM THE BACK OF CURB, THE DETECTABLE WARNING SHALL BE LOCATED ON THE LOWER LANDING.

| | | |
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | <h2>CURB RAMPS</h2> | |
| | DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 5/29/2015 | <h1>608.50</h1> |

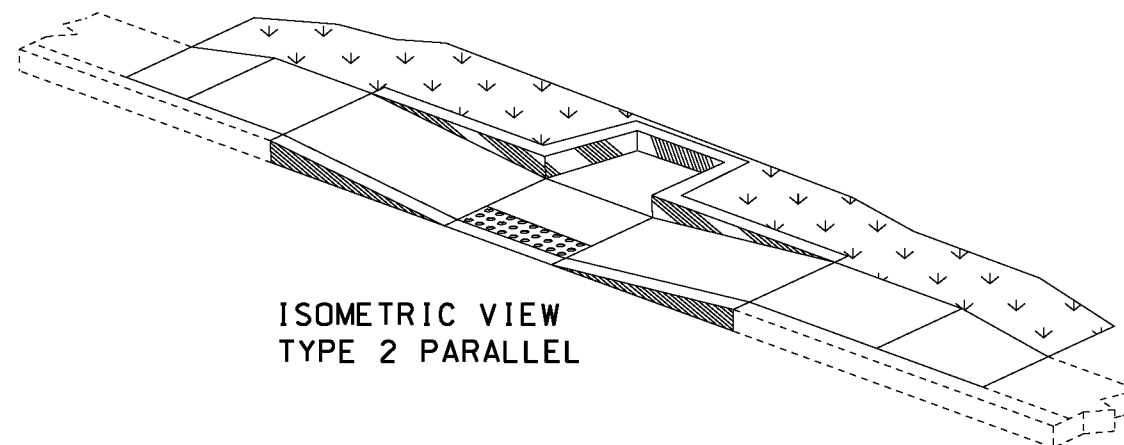


SECTION B-B

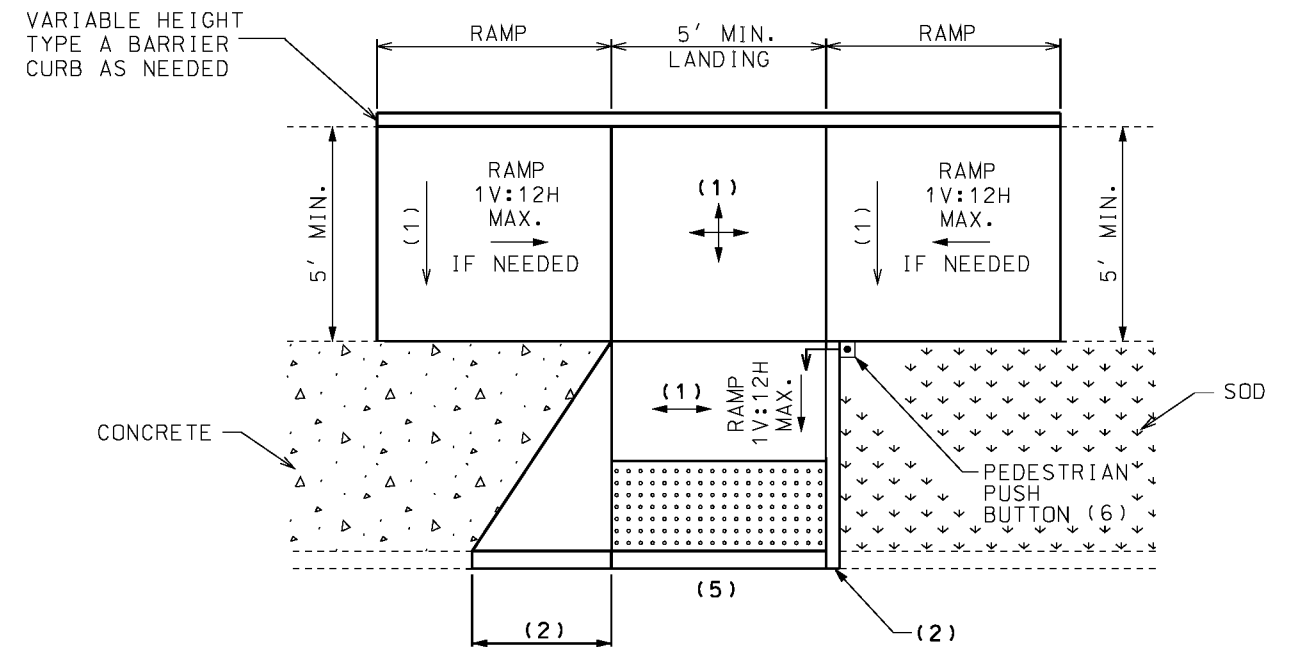
TYPE 1 PARALLEL



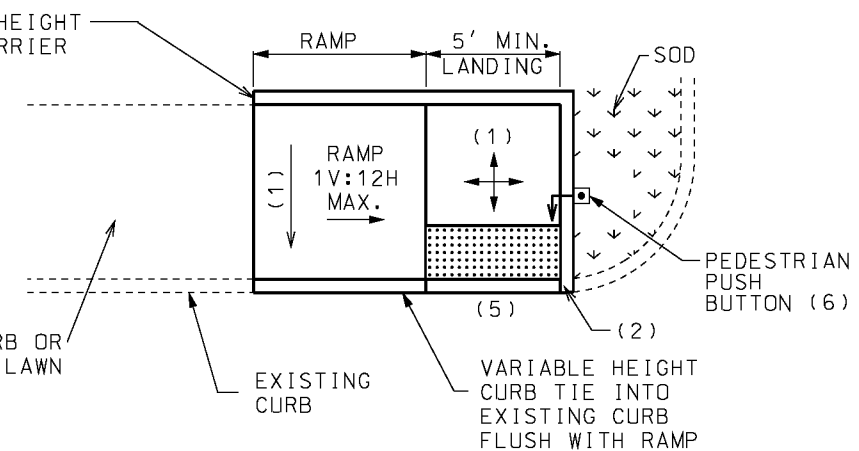
TYPE 2 PARALLEL



ISOMETRIC VIEW
TYPE 2 PARALLEL




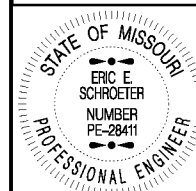
COMPOUND PERPENDICULAR

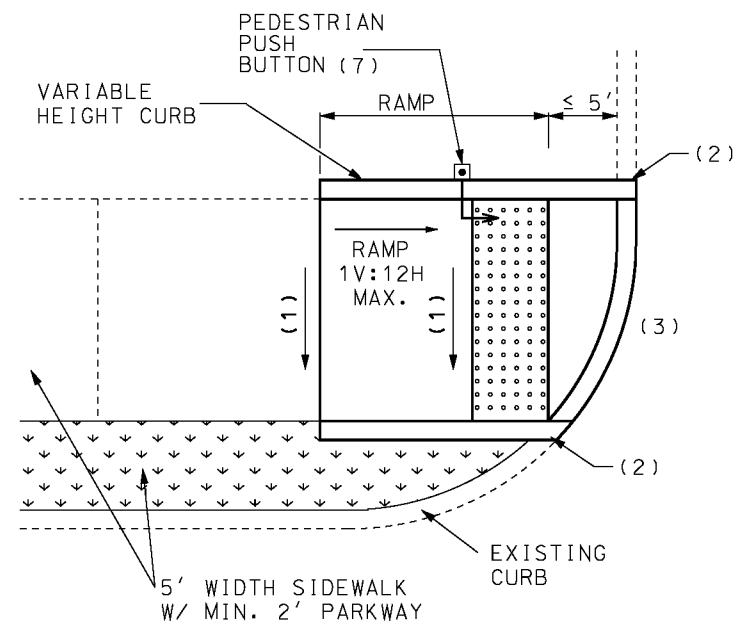


TYPE 3 PARALLEL

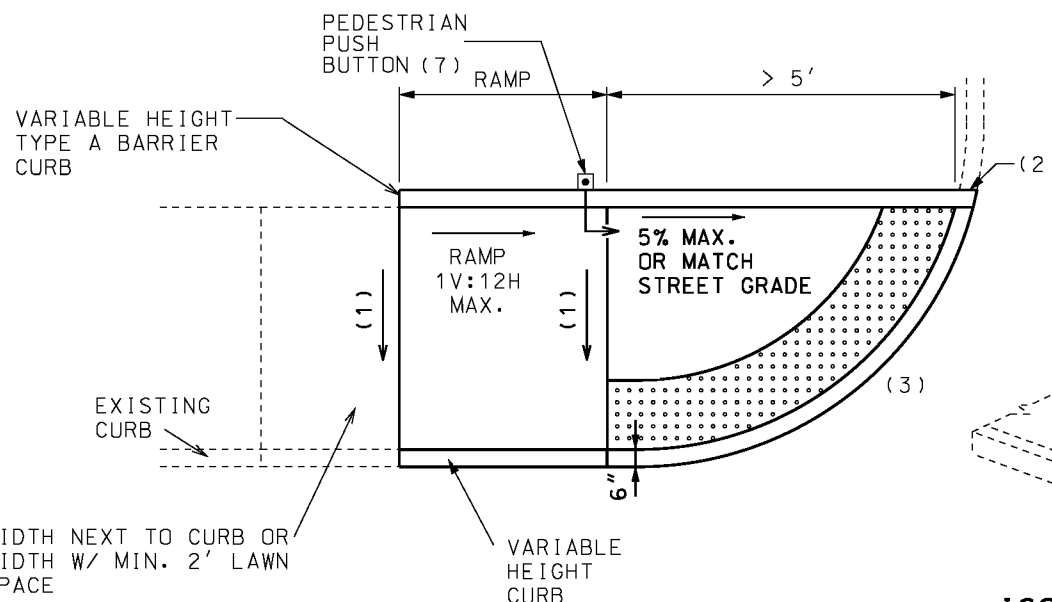
GENERAL NOTES:

- (1) 1.0% (2.0% MAX.) OR ROAD GRADE EXCEPTION
- (2) VARIABLE HEIGHT VERTICAL CURB . IF TRAVERSABLE USE A MAX. 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
- (3) ENSURE THAT THE INSIDE EDGE OF CURVED RAMPS MAINTAIN AN 8.3% (1V:12H) MAXIMUM SLOPE.
- (4) HEIGHT VARIES TO MEET EXISTING GROUND.
- (5) THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
- (6) THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE 0" OFFSET FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.

| | | |
|--|--|---------------|
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|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | <h2>CURB RAMPS</h2> | |
| | DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 608.50 |

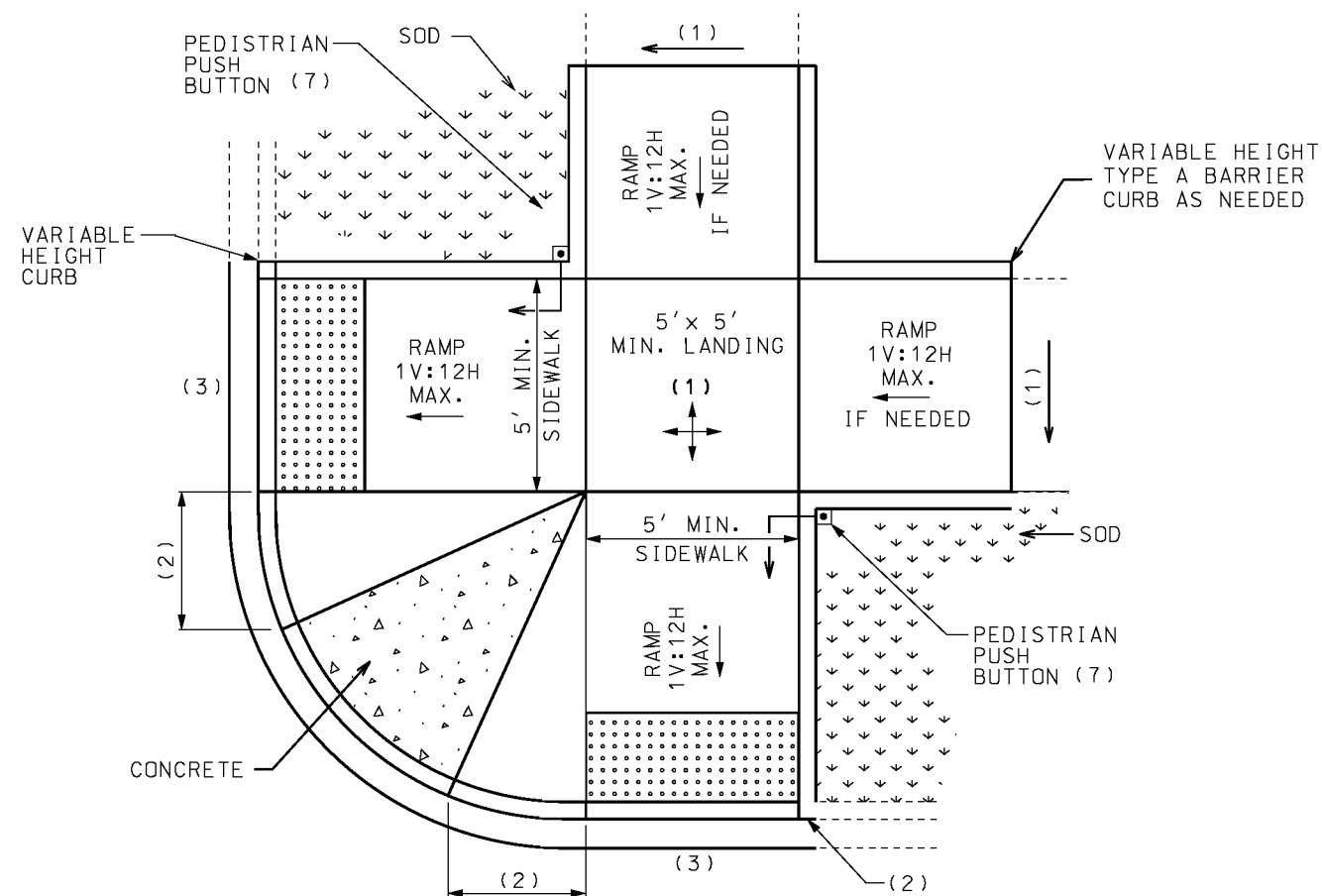


SMALL RADIUS PERPENDICULAR

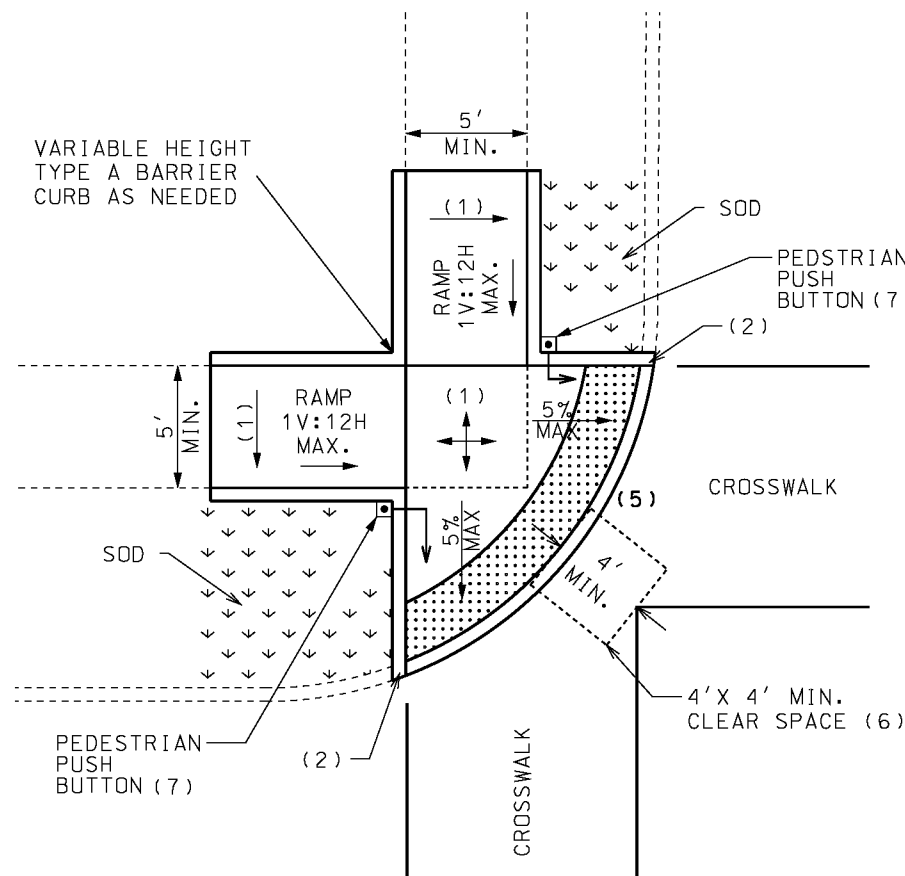


LARGE RADIUS PERPENDICULAR

ISOMETRIC VIEW
LARGE RADIUS PERPENDICULAR





DUAL PERPENDICULAR

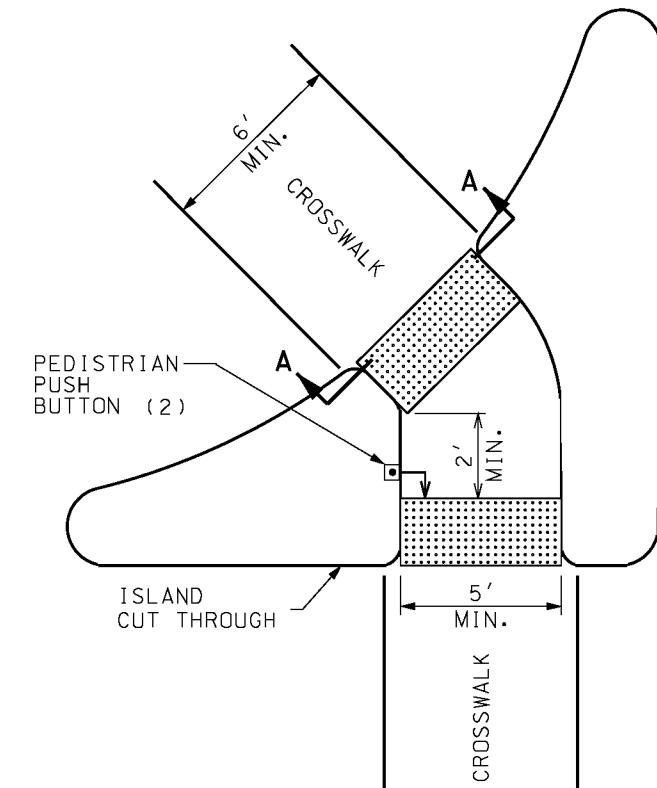
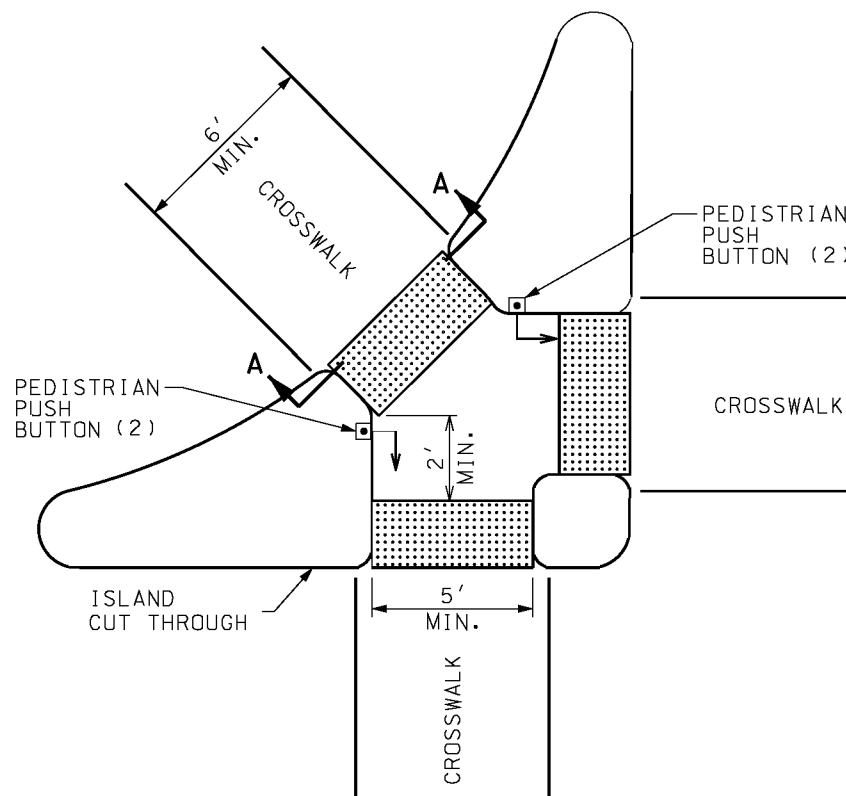
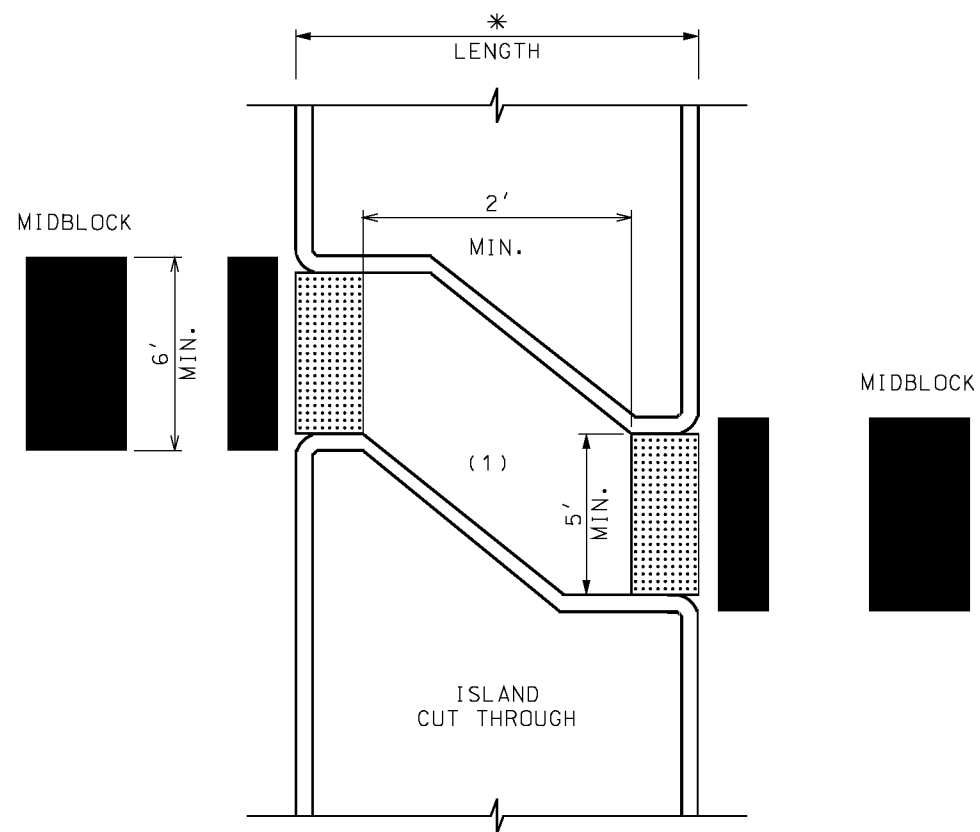


BLENDED TRANSITION

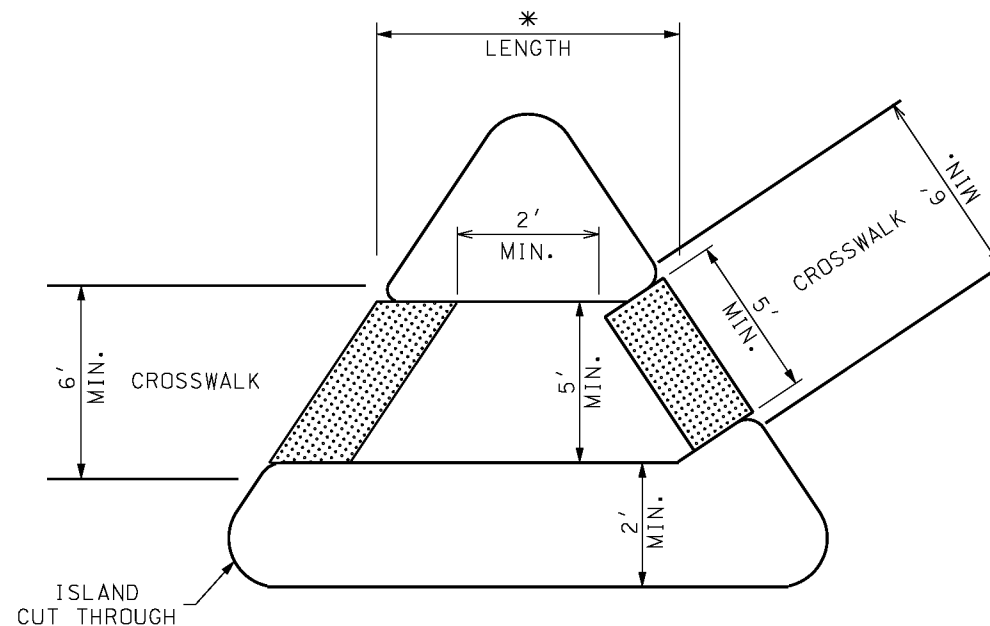
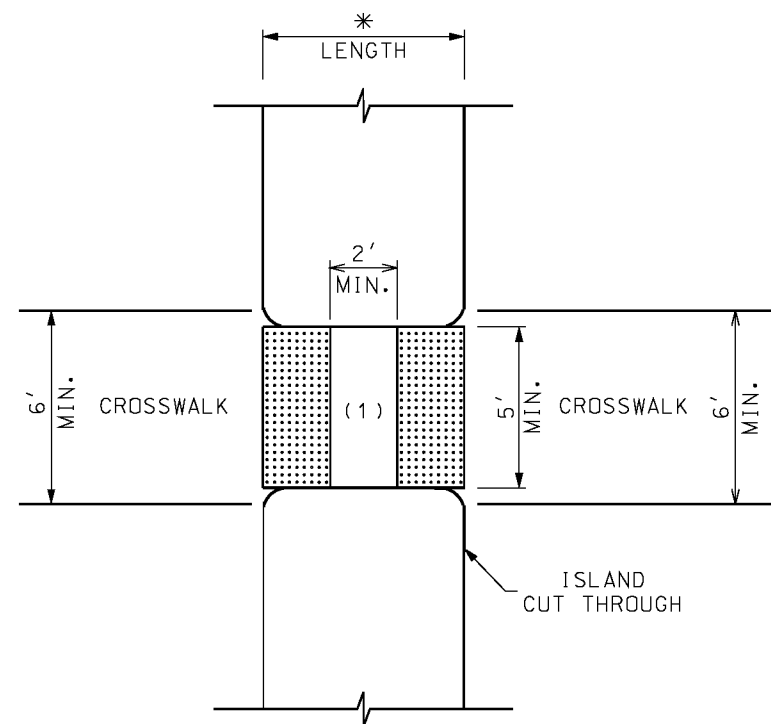
GENERAL NOTES:

- (1) 1.0% MINIMUM, 2.0% MAXIMUM.
- (2) VERTICAL OR 1' FLARE. IF TRAVERSABLE USE A MAX. 1V:10H FLARE MEASURED PARALLEL TO THE CURB LINE.
- (3) ENSURE THAT THE INSIDE EDGE OF CURVED RAMP MAINTAIN AN 8.3% (1V:12H) MAXIMUM SLOPE.
- (4) HEIGHT VARIES TO MEET EXISTING GROUND.
- (5) THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF CURB RAMP RUNS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 5% MAXIMUM.
- (6) BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE 4' X 4' MINIMUM SHALL BE PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.
- (7) THE FACE OF PEDESTRIAN PUSH BUTTONS SHALL BE 0" OFFSET FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.

| | | |
|--|---|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | <h2 style="text-align: center;">CURB RAMPS</h2> | |
| DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | <h1 style="font-size: 2em;">608.50</h1> | SHEET NO. 3 of 4 |



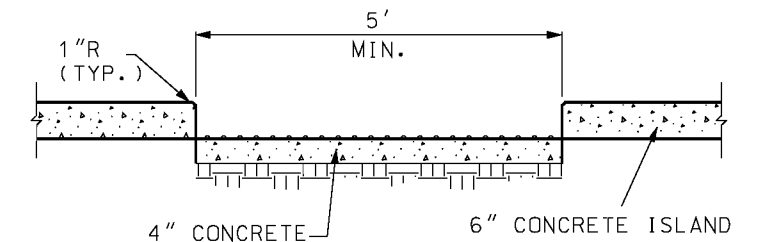
(2) PEDESTRIAN PUSH BUTTONS SHALL BE 0" OFFSET FOR FRONT APPROACH AND 10" MAX. FOR SIDE APPROACH TO THE CURB FACE.



* DETECTABLE WARNING SURFACES SHALL BE OMITTED IF LENGTH IS < 6', BECAUSE REFUGE SPACE IS DEEMED TOO SMALL.

ISLAND CUT THROUGHS

(1) DETECTABLE WARNING SURFACES SHALL BE PLACED AT THE EDGES OF THE PEDESTRIAN ISLAND AND SHALL BE SEPARATED BY 2' MIN. LENGTH OF SURFACE WITHOUT DETECTABLE WARNINGS.

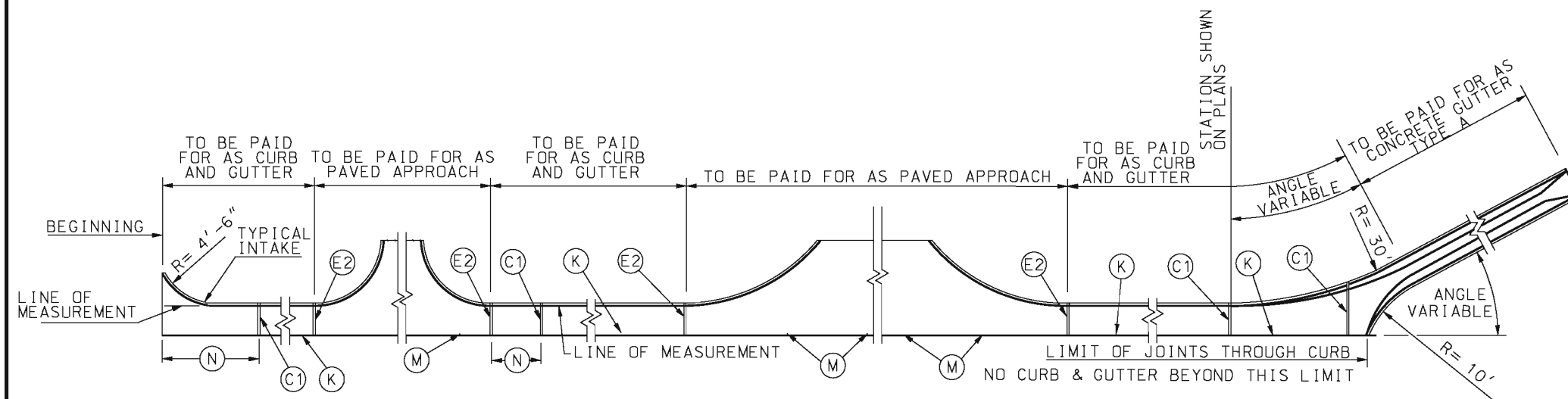


SECTION A-A ISLAND CUT THROUGH TYPICAL

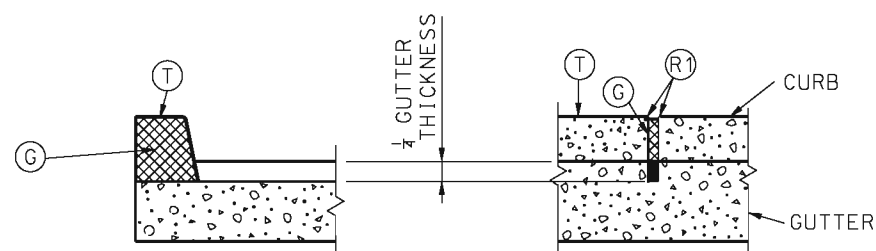
RAMP OR CUT-THROUGH DEPENDING ON ISLAND WIDTH. IF RAMPED, PROVIDE 4' MINIMUM LANDING AND SLOPE RAMPS AT 1V:12H MAX.

RAMP MUST BE CONSTRUCTED TO DRAIN TO THE OUTSIDE.

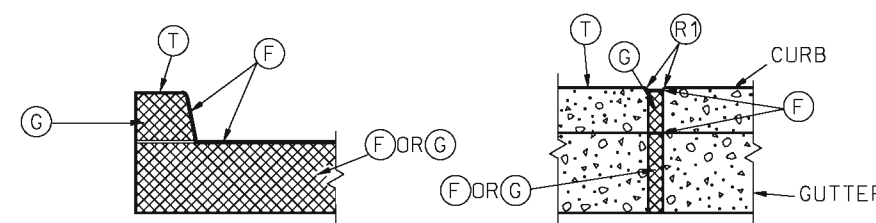
| | | |
|--|-------------------|----------------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| MoDOT STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | CURB RAMPS | |
| DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 608.50 | SHEET NO. 4 of 4 |



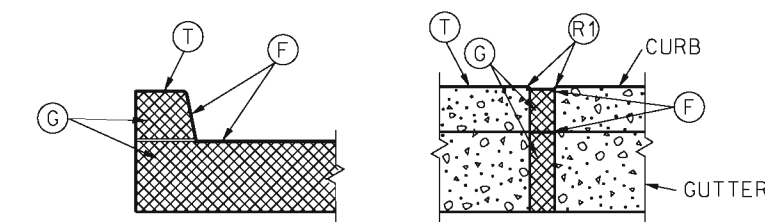
PLAN OF MEASUREMENT OF CURB & GUTTER AND JOINT PLAN



C1 JOINT



E2 JOINT



E1 JOINT

LEGEND

- C1 1/8" MAXIMUM WIDTH TRANSVERSE CONTRACTION JOINT (PREFORMED OR SAWED).
- E1 2" TRANSVERSE EXPANSION JOINT. (PREFORMED OR SAWED)
- E2 1/2" TRANSVERSE EXPANSION JOINT. (PREFORMED OR SAWED)
- F FILLER FOR JOINTS - HOT POURED.
- G PREFORMED JOINT FILLER MATERIAL.
- K TONGUE & GROOVE JOINT WITH TIE BAR - SEE DETAIL.
- M TONGUE & GROOVE JOINT WITHOUT TIE BARS - SEE DETAIL.
- N NOT LESS THAN 10' OR MORE THAN 30'.
- T TOP OF CURB.
- R1 ROUND TO 1/4" RADIUS. (EXCEPT FOR SAWED JOINTS)

GENERAL NOTES:

A MINIMUM 4" TYPE 1 OR 5 AGGREGATE BASE SHALL BE PLACED BENEATH ALL CURB AND GUTTER SECTIONS AND INCLUDED WITHIN THE MAINLINE BASE PAY LIMITS.

WHEN CURBS ARE CONSTRUCTED DIRECTLY BENEATH GUARDRAIL, CURB HEIGHT SHALL BE 4 INCH BARRIER CURB, AS SHOWN ON STANDARD PLAN 606.00.

CURB, GUTTER AND CURB AND GUTTER CONSTRUCTED ALONG AND ATTACHED TO CONCRETE PAVEMENT OR BASE SHALL HAVE:

1. JOINT C1 ONE-QUARTER DEPTH OF CURB AND GUTTER THICKNESS AS A CONTINUATION OF EACH CONTRACTION JOINT IN THE BASE OR PAVEMENT.
2. JOINT E1 AS CONTINUATION OF 2" EXPANSION JOINT E IN THE CONCRETE BASE OR PAVEMENT SHALL EXTEND AND CONTINUE THROUGH THE CURB, CUTTER AND CURB AND GUTTER.
3. JOINT E2 THROUGH CURB AND CURB AND GUTTER AT THE BEGINNING AND END OF EACH PAVED APPROACH.

CURB, CURB AND GUTTER AND GUTTER CONSTRUCTED APART OR SEPARATED FROM CONCRETE BASE OR PAVEMENT OR AS A FORM FOR ASPHALTIC CONCRETE PAVEMENT SHALL HAVE A JOINT E2 ENTIRELY THROUGH THE CURB, CURB AND GUTTER AND GUTTER. AT THE BEGINNING AND END OF EACH "PAVED APPROACH" AND A JOINT C1 TO 1/4 DEPTH OF CURB AND GUTTER THICKNESS AT INTERVALS OF 30 FEET BETWEEN APPROACHES.

JOINTS E1 AND E2 THROUGH CURB SHALL BE FILLED WITH PREFORMED FILLER MATERIAL AND SEALED WITH HOT POURED FILLER FOR JOINTS.

JOINT E1 IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH HOT FILLER MATERIAL.

JOINT E2 IN GUTTER SHALL BE FILLED WITH PREFORMED FILLER AND SEALED WITH FILLER OR FILLED WITH HOT POURED FILLER.

PREFORMED FILLER MATERIAL SHALL BE PLACED TO PROVIDE 1" HOT POURED FILLER FOR JOINTS.

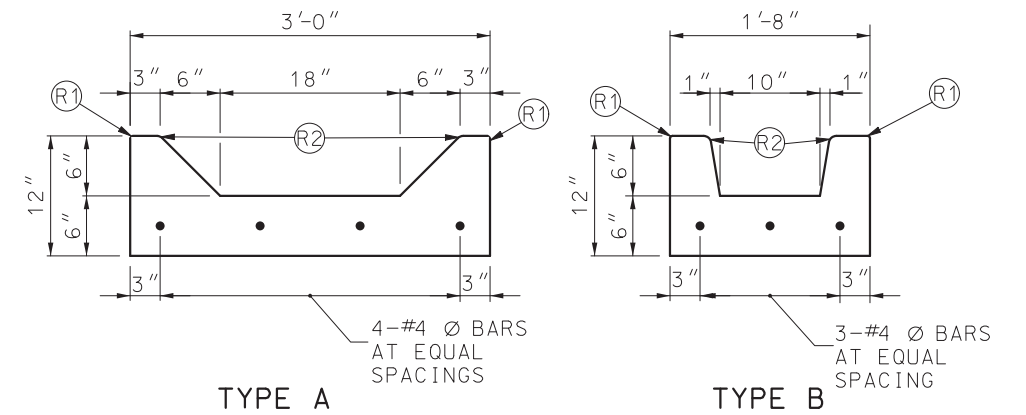
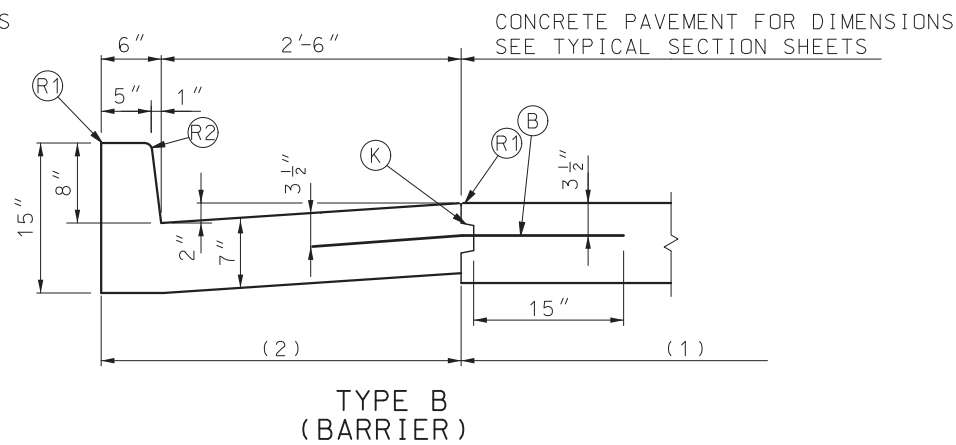
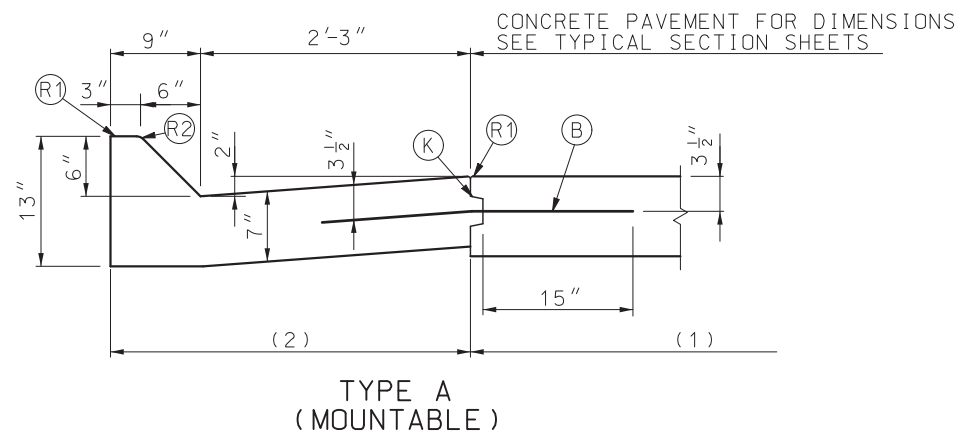
THE BARRIER CLASS CURBS MAY BE CONSTRUCTED WITHOUT BATTER WHEN CONSTRUCTED ON A RADIUS OF 6 FEET OR LESS. THE R2 WILL BE REQUIRED.

WHERE A SIDEWALK INTERSECTS A CURB, THE SIDEWALK SHALL BE RAMPED NO STEEPER THAN 12:1 SLOPE TO PROVIDED ACCESS FOR WHEELCHAIR ACROSS APPROACHES.

WHEN ALLOWED BY THE ENGINEER, TYPES A AND B GUTTER MAY BE PRECAST TO CONFORM TO THE DIMENSIONS SHOWN. THE PRECASTER SHALL SUBMIT SHOP DRAWINGS INDICATING THE SECTION LENGTH, SECTION CONNECTION, AND PROPOSED JOINT SEALING SYSTEM. WHEN PRECAST SECTIONS CANNOT CONFORM TO ANY VERTICAL OR HORIZONTAL CURVE DESIGNATED ON THE PLANS, THE GUTTER SHALL BE CAST-IN-PLACE. A COMBINATION OF CAST-IN-PLACE AND PRECAST GUTTER MAY BE PERMITTED.

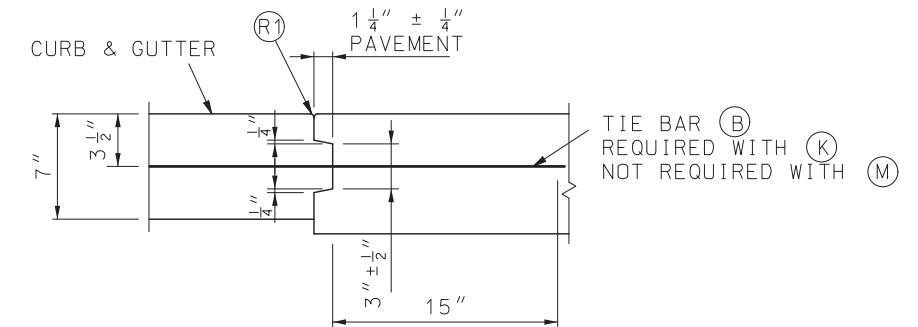
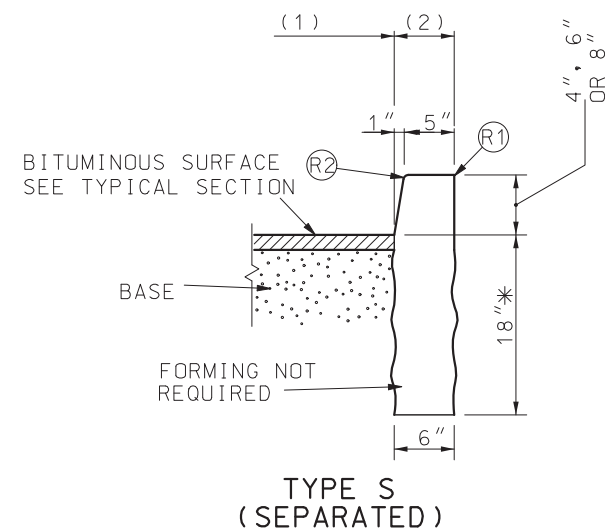
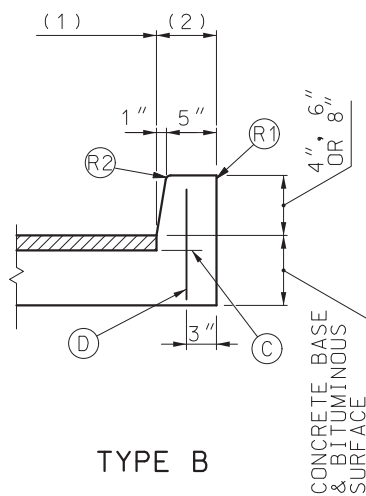
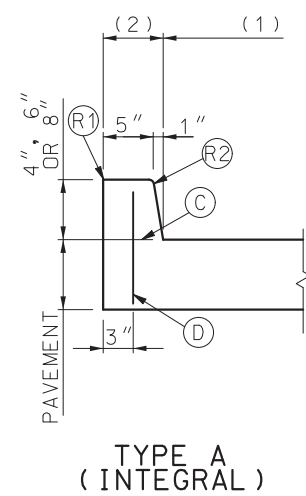
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|--|--|---------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | CONCRETE CURB, CURB AND GUTTER AND GUTTER | |
| DATE EFFECTIVE: 08/01/2008 DATE PREPARED: 12/29/2011 | 609.00P | SHEET NO. 1 OF 2 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

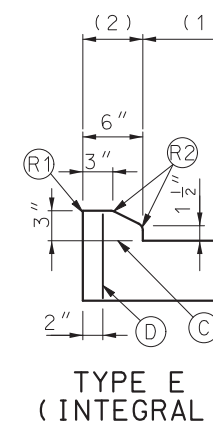
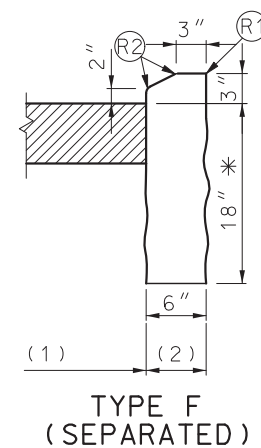
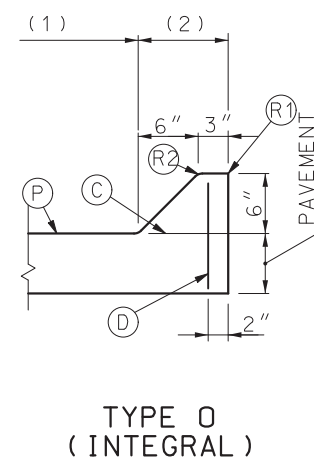
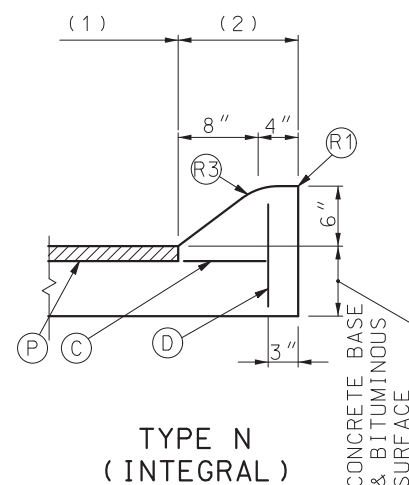
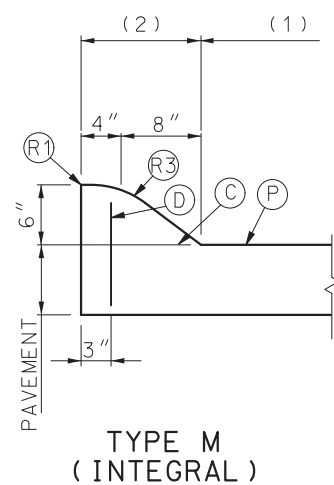


CURB & GUTTER

GUTTERS



BARRIER CURBS



BEGINNING AND ENDINGS OF INTRODUCED LOW PROFILE CURBS SHALL UTILIZE CURB HEIGHT RUNOUT FORM 0 INCH TO 3 INCHES IN 5 FEET PAYMENT. LENGTH SHALL INCLUDE TAPERS.

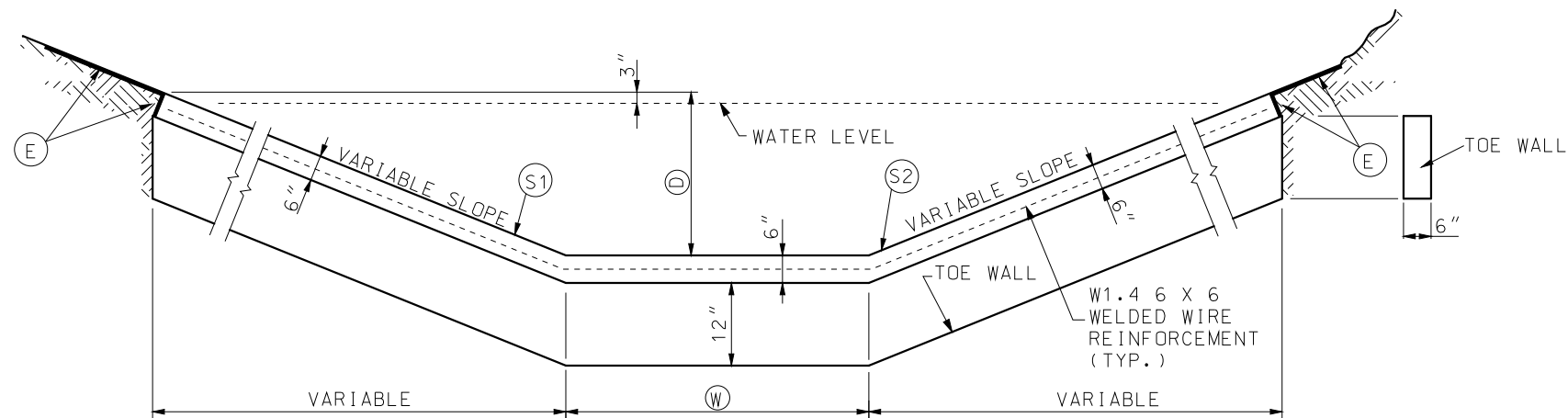
* DEPTH MAY BE REDUCED IF KEYED 6" IN ROCK.

LOW PROFILE CURB

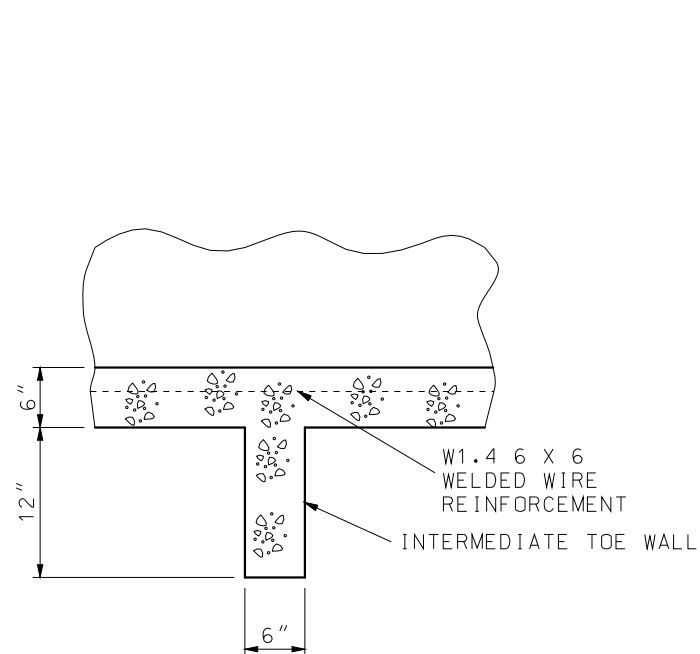
LEGEND

- (B) TIE BARS - 30" X #5 Ø AT 30" CTRS.
- (C) PERMISSIBLE CONSTRUCTION JOINT. IF CONSTRUCTED IN THIS MANNER TIE BARS MUST BE USED.
- (D) #4 Ø TIE BAR AT 24" CENTERS LENGTH OF THE TIE BARS EQUALS THICKNESS OF PAVEMENT PLUS HEIGHT OF CURB, LESS 3 INCHES.
- (K) TONGUE & GROOVE JOINT WITH TIE BAR - SEE DETAIL.
- (P) TOP OF PAVEMENT OR CONCRETE BASE.
- (R1) ROUND TO 1/4" RADIUS. (EXCEPT FOR SAWED JOINTS)
- (R2) ROUND TO 3/4" RADIUS.
- (R3) CONSTRUCT TO 9" RADIUS
- (1) PAY LIMIT FOR PAVEMENT
- (2) PAY LIMIT FOR CURB, OR CURB & GUTTER.

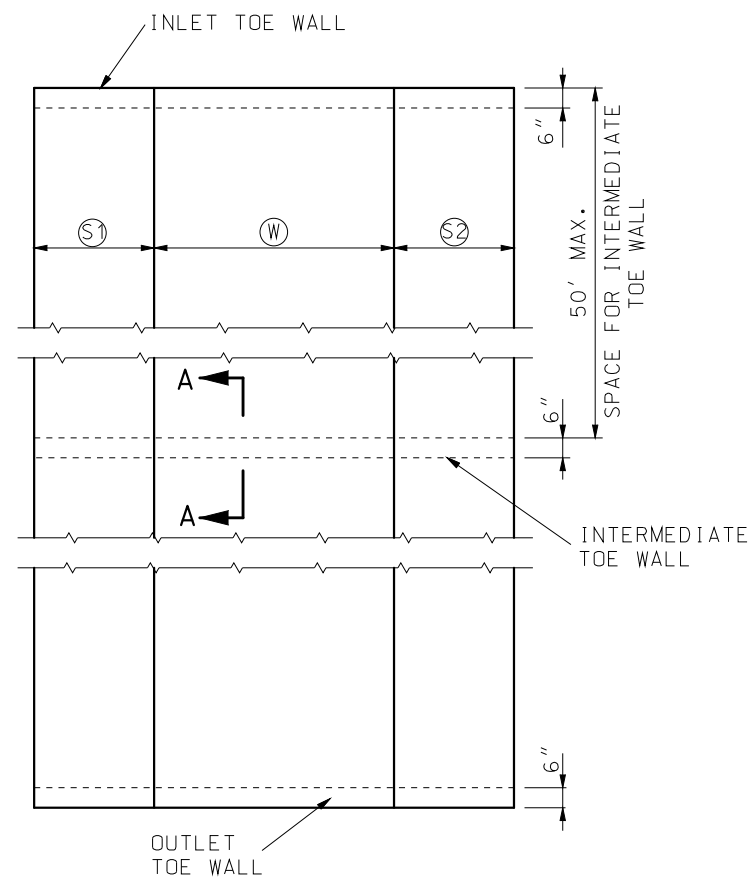
| | | |
|--|---|----------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| | CONCRETE CURB, CURB AND GUTTER AND GUTTER | |
| | DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018 | 609.00P |



SECTION THROUGH DITCH
(SHOWING TOE WALL)



SECTION A-A



PLAN

LEGEND


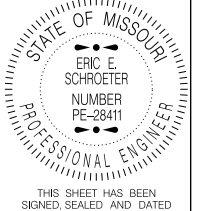
- (D) VERTICAL PAVED DITCH HEIGHT.
- (E) SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MAT, IF REQUIRED.
- (S1) THE WIDTH OF THE STEEPER SIDEWALL OF ALL DITCHES.
- (S2) THE WIDTH OF THE FLATTER SIDEWALL OF ALL DITCHES.
- (W) THE WIDTH OF THE BOTTOM OF A FLAT BOTTOM DITCH

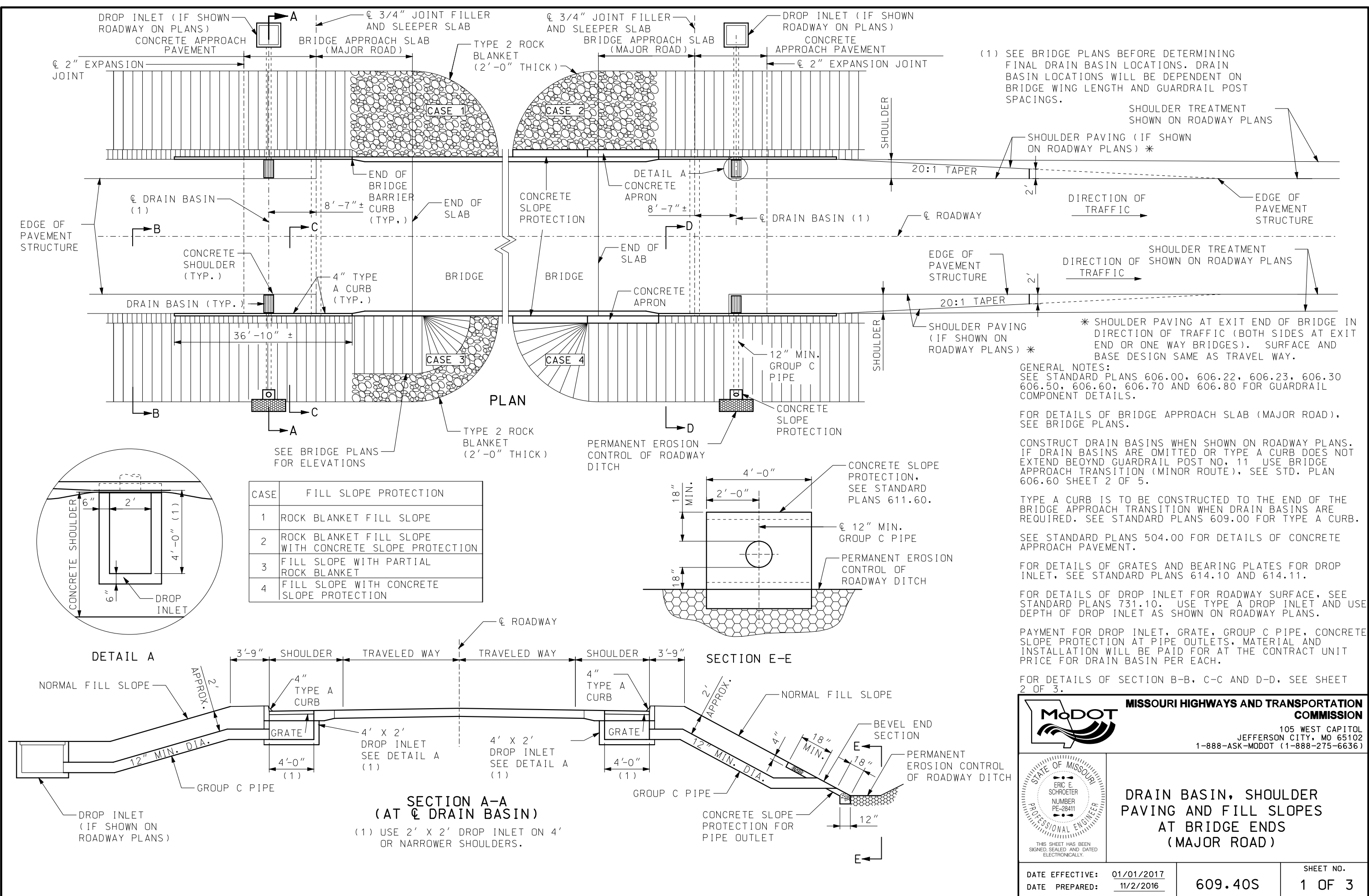
GENERAL NOTES:

STEEL WELDED WIRE REINFORCEMENT SHALL BE IN ACCORDANCE WITH SEC 1036.3.3.

SOD, GEOTEXTILE FABRIC, OR EROSION CONTROL MATS SHALL BE USED ALONG THE SIDES IF SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

TOE WALLS SHALL BE CONSTRUCTED AT INLET AND OUTLET ENDS OF PAVED DITCHES AND AT 50' MAXIMUM SPACING FOR INTERMEDIATE TOE WALLS.

| | |
|--|-----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PAVED DITCHES</p> |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 609.15D |
| SHEET NO. 1 OF 1 | |



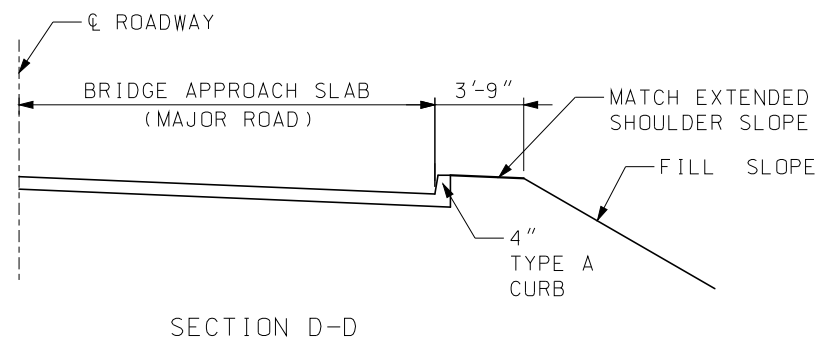
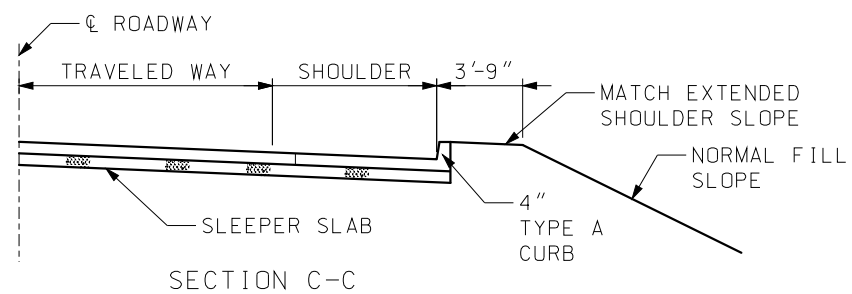
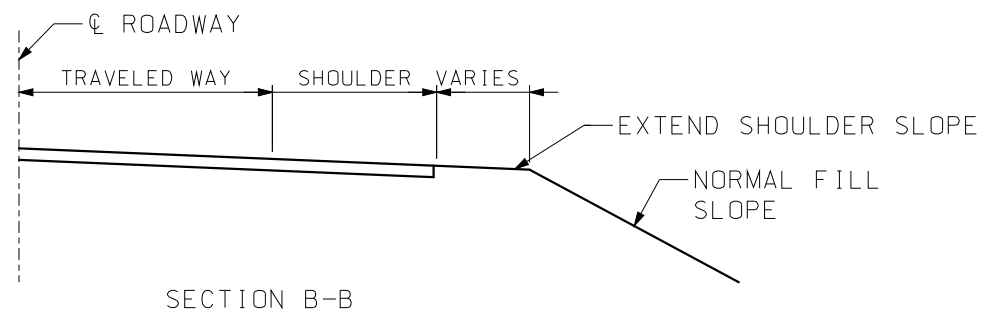
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

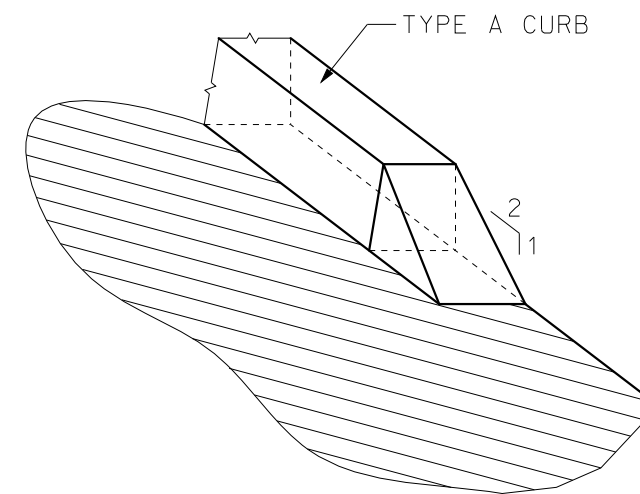
DRAIN BASIN, SHOULDER PAVING AND FILL SLOPES AT BRIDGE ENDS (MAJOR ROAD)

| | | | |
|-----------------|------------|---------|---------------------|
| DATE EFFECTIVE: | 01/01/2017 | 609.40S | SHEET NO. 1 OF 3 |
| DATE PREPARED: | 11/2/2016 | | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



NOTE: FOR DETAILS NOT SHOWN,
SEE OTHER SECTIONS.

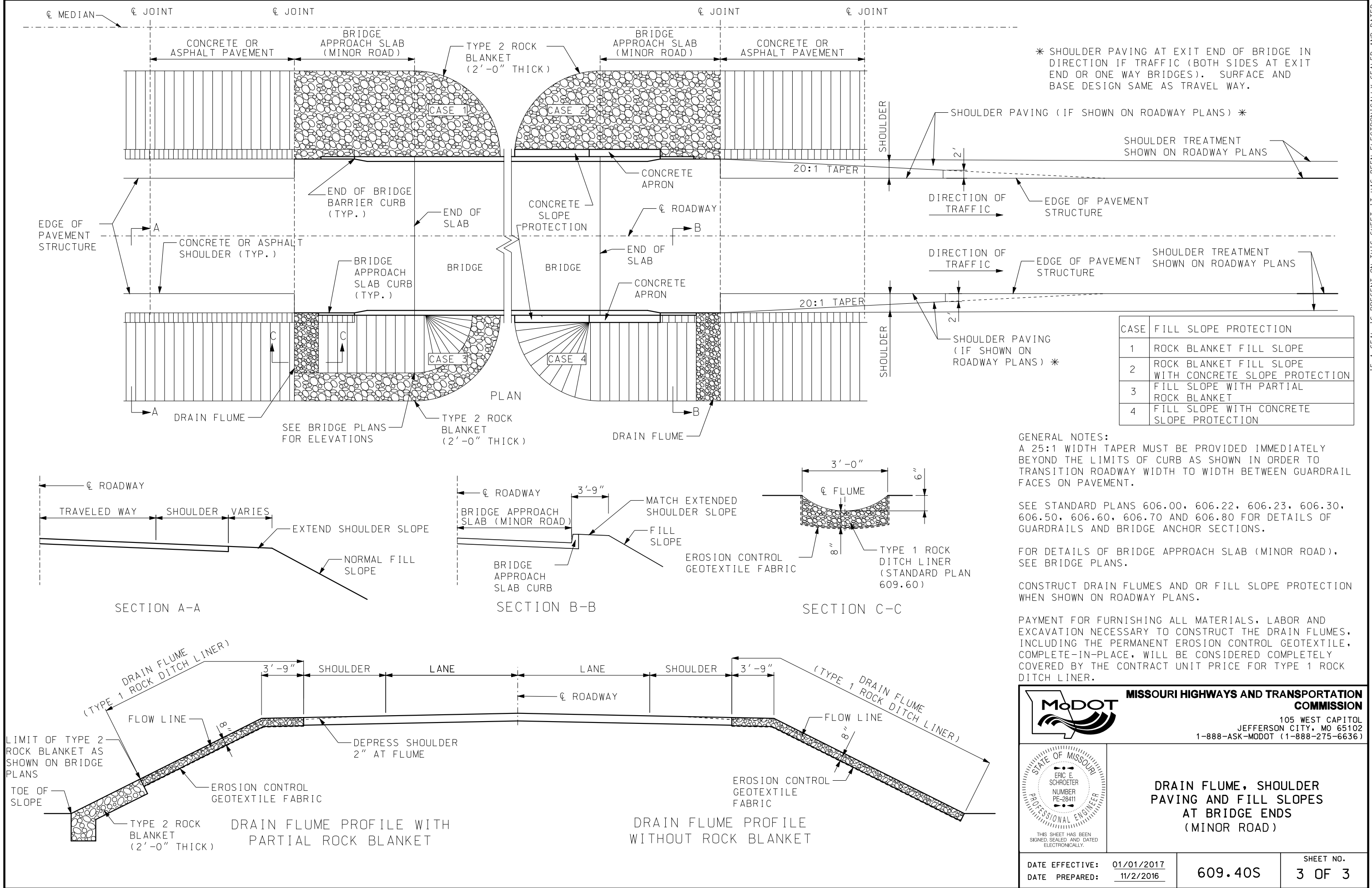


TYPE A CURB
TRANSITION DETAIL

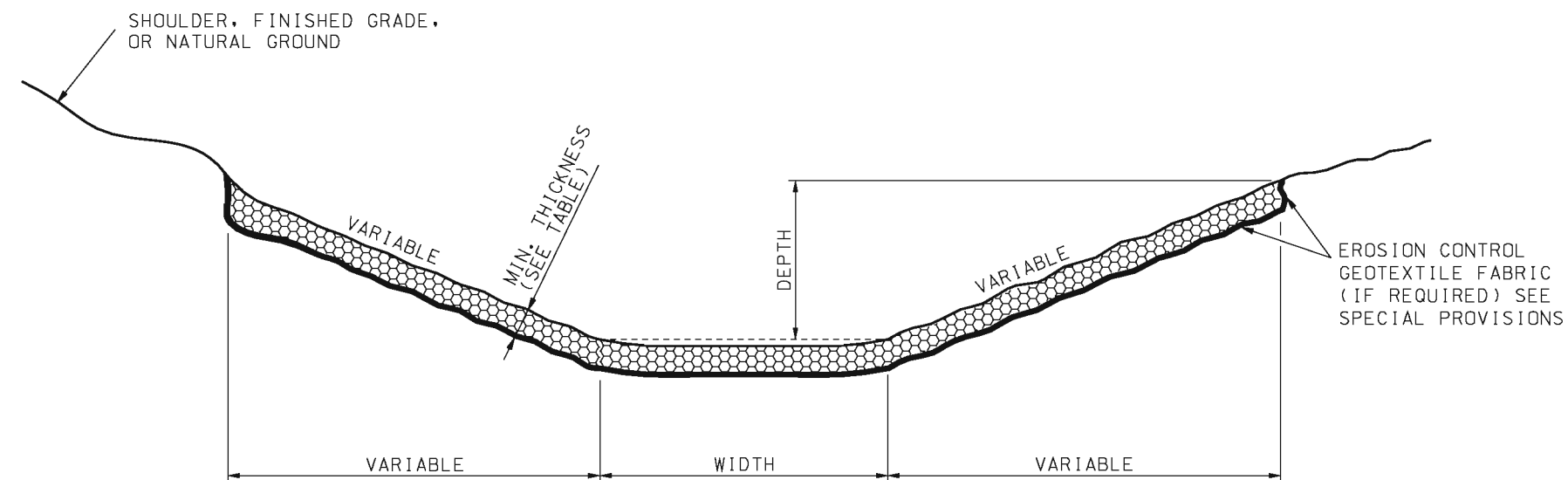
GENERAL NOTE:

FOR LOCATION OF SEC. B-B, C-C AND D-D, SEE
SHEET 1 OF 3.

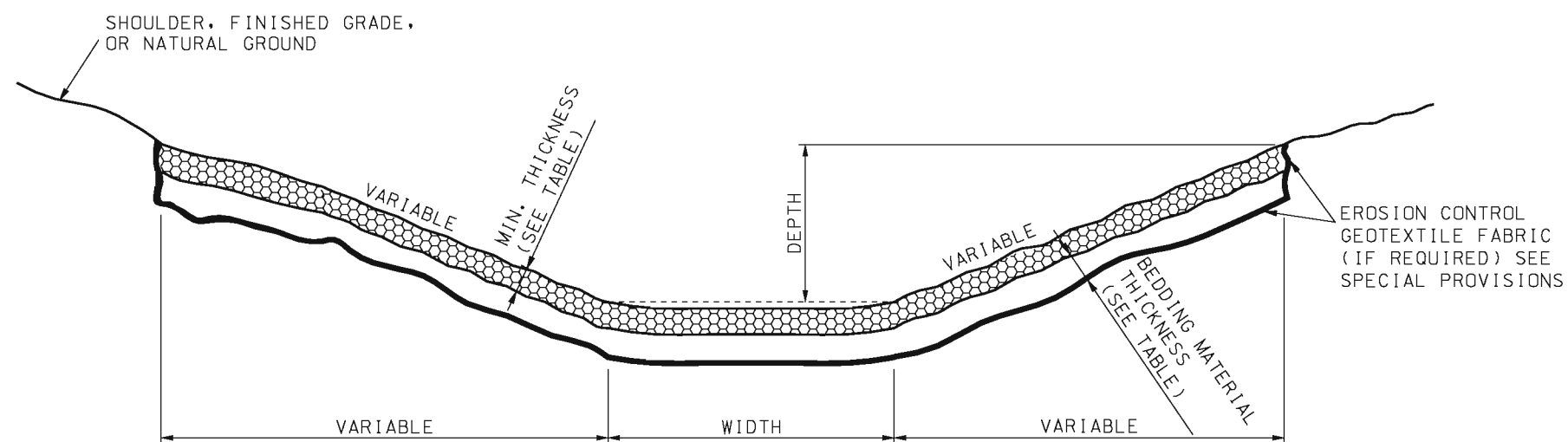
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>DRAIN BASIN, SHOULDER PAVING AND FILL SLOPE AT BRIDGE ENDS (MAJOR ROAD)</p> |
| DATE EFFECTIVE: 01/01/2017 DATE PREPARED: 11/2/2016 | 609.40S |
| SHEET NO. 2 OF 3 | |



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



FLAT BOTTOM DITCH
WITHOUT BEDDING MATERIAL



FLAT BOTTOM DITCH
WITH BEDDING MATERIAL

TYPICAL DITCH LINER DETAILS

| TYPE | ROCK DITCH LINER MIN. THICKNESS | BEDDING MATERIAL MIN. THICKNESS |
|------|---------------------------------|---------------------------------|
| 1 | 8" | -- |
| 2 | 12" | -- |
| 3 | 22" | 8" |
| 4 | 30" | 12" |

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

KATHRYN PHILLIPS HARVEY

NUMBER PE-23751

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

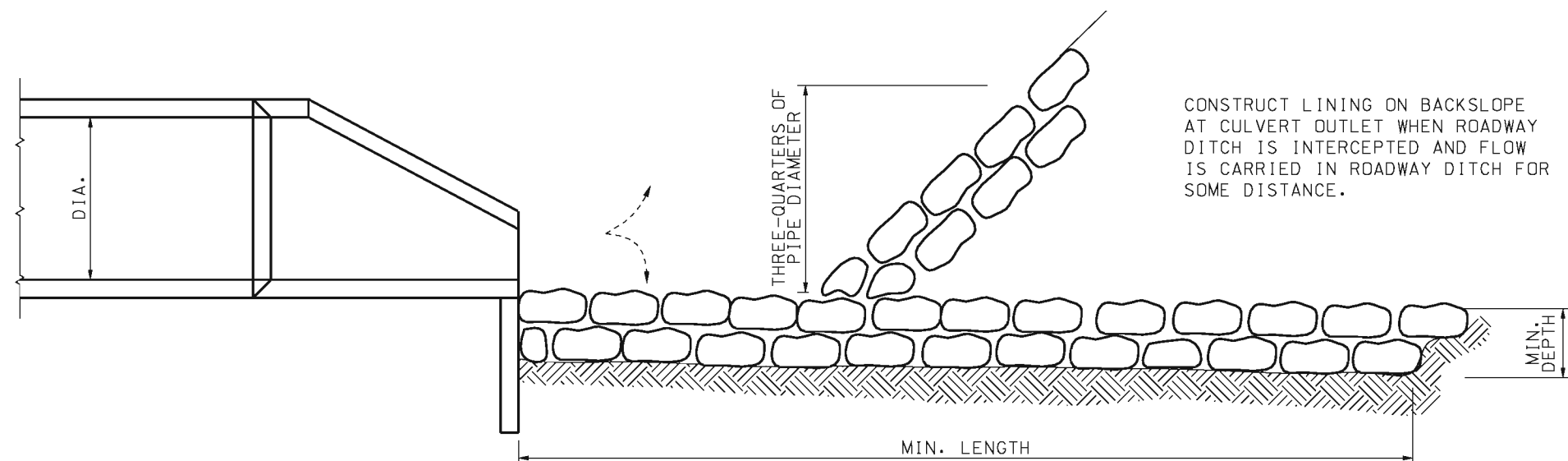
ROCK DITCH LINER

DATE EFFECTIVE: 03/01/1993

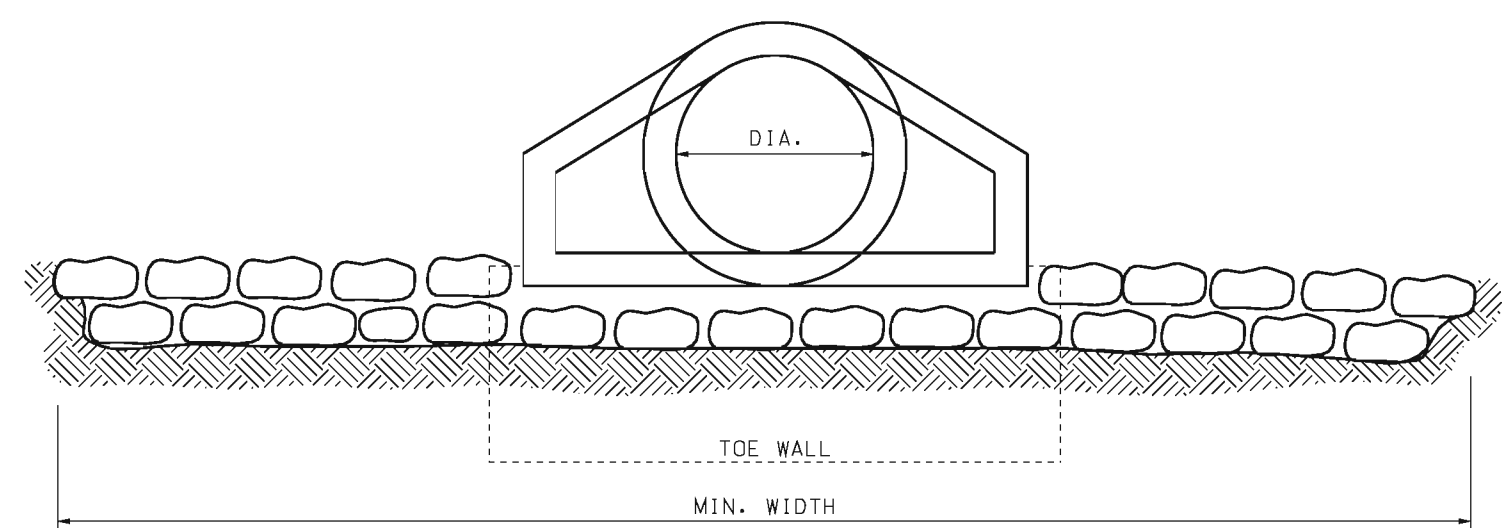
DATE PREPARED: 8/21/2009

609.60C

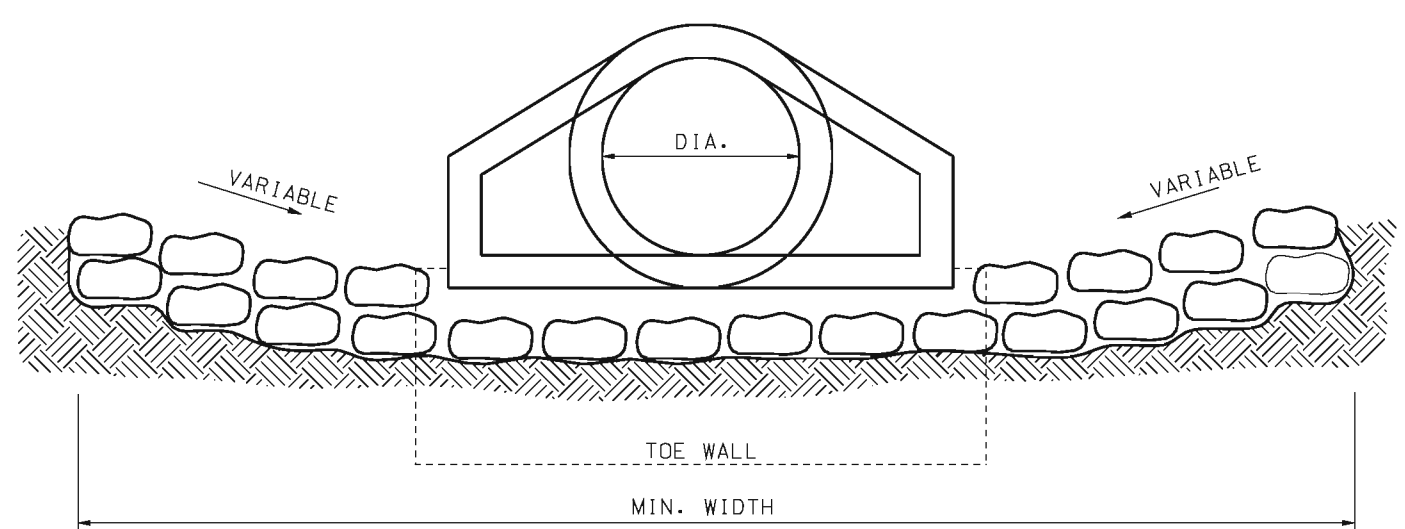
SHEET NO. 1 OF 1



SIDE VIEW



END VIEW



END VIEW
(ALTERNATE METHOD)

| ROCK LINING FOR CULVERT OUTLETS | | | | | |
|---------------------------------|-------------------------------|----------------------|----------------------|--|---|
| CULVERT SIZE, DIA (IN.) | MINIMUM DEPTH AND WIDTH (FT.) | MINIMUM LENGHT (FT.) | ROCK LINING (CU.YD.) | EQUIVALENT PIPE ARCH CULVERT (APPROX.) | EQUIVALENT CONCRETE BOX CULVERT (APPROX.) |
| 18 | 1 X 4 | 12 | 2 | | |
| 24 | 1 X 6 | 14 | 3 | | 2' X 1 1/2' |
| 30 | 1 X 7 | 16 | 4 | B-5 | 2' X 2' |
| 36 | 1.5 X 9 | 18 | 9 | B-6 | 3' X 2' |
| 42 | 2 X 10 | 20 | 15 | B-7 | 3' X 3' |
| 48 | 2 X 12 | 20 | 18 | B-8 | 4' X 3' |
| 54 | 2 X 13.5 | 22 | 22 | B-9 | 4' X 4' |
| 60 | 2 X 15 | 25 | 28 | B-10 | 5' X 4' |
| 66 | 2 X 18 | 25 | 33 | B-11 | 5' X 5' |
| 72 | 2 X 20 | 30 | 44 | B-12 | 5' X 6' |
| 84 | 2.5 X 25 | 35 | 81 | | 6' X 6' |
| 96 | 2.5 X 30 | 40 | 111 | | 7' X 7' |
| 108 | 3 X 32 | 40 | 142 | | 8' X 8' |

GENERAL NOTES:

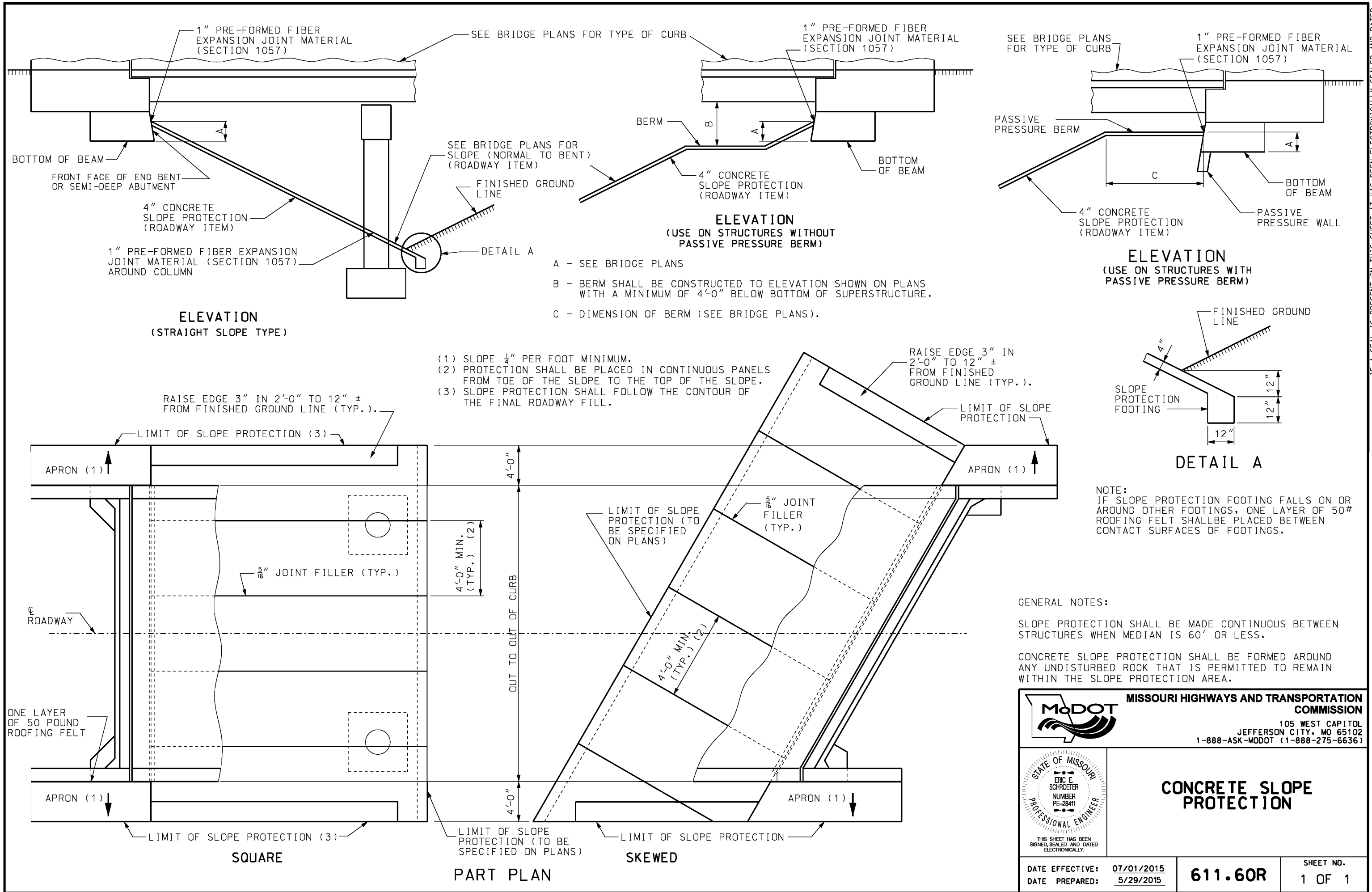
THE DIMENSIONS SHOWN IN THE TABLE CAN BE APPLIED TO BOX OR ARCH CULVERTS OF EQUIVALENT WATERWAY AREA.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION


105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

ROCK LINING FOR CULVERT OUTLET

| | | |
|----------------------------|----------------|---------------------|
| DATE EFFECTIVE: 10/01/1981 | 609.70C | SHEET NO. 1 OF 1 |
| DATE PREPARED: 8/21/2009 | | |




IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE SLOPE PROTECTION

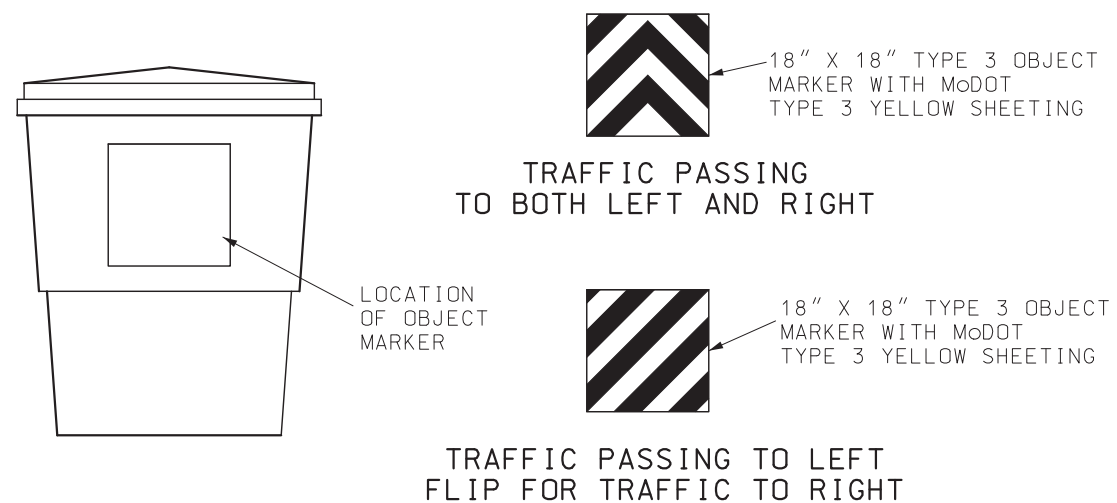
DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/29/2015

611.60R

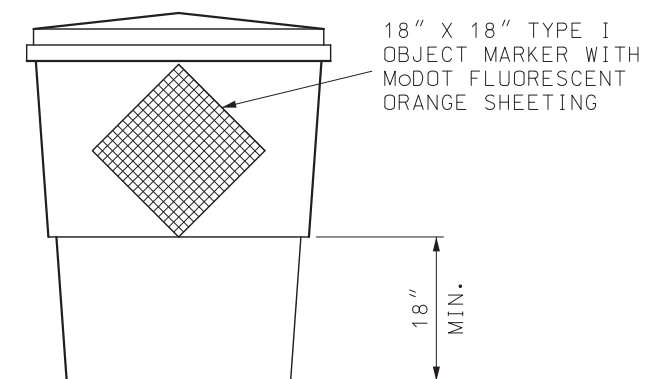
SHEET NO.
1 OF 1

ATTENUATOR LAYOUT:

ALL SAND FILLED ATTENUATORS SHOULD MEET MANUFACTURER'S RECOMMENDATIONS FOR THE ARRAY AND SAND WEIGHT.





TYPE 3 OBJECT MARKER PLACEMENT FOR PERMANENT INSTALLATIONS



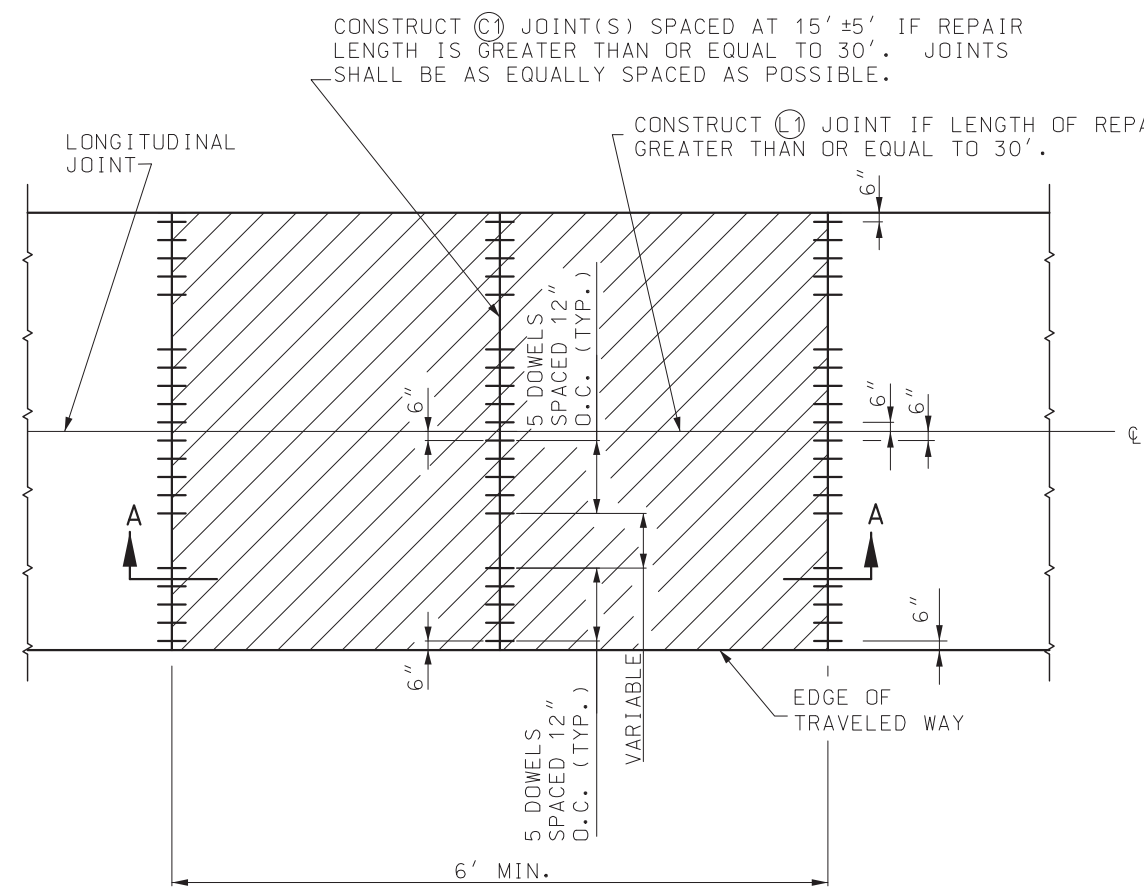
TYPE I OBJECT MARKER PLACEMENT FOR TEMPORARY INSTALLATIONS

GENERAL NOTES:

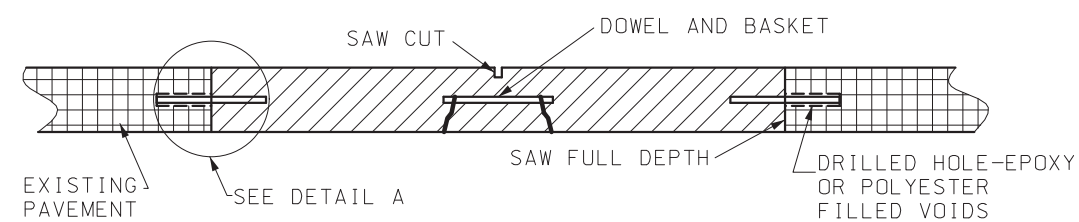
OBJECT MARKERS SHALL BE CENTERED VERTICALLY OR PLACED AS DIRECTED BY THE ENGINEER.

| | | | |
|---|------------|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | SAND FILLED IMPACT ATTENUATORS | |
| THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | | | |
| DATE EFFECTIVE: | 10/01/2018 | 612.20E | SHEET NO. 1 OF 1 |
| DATE PREPARED: | 7/31/2018 | | |

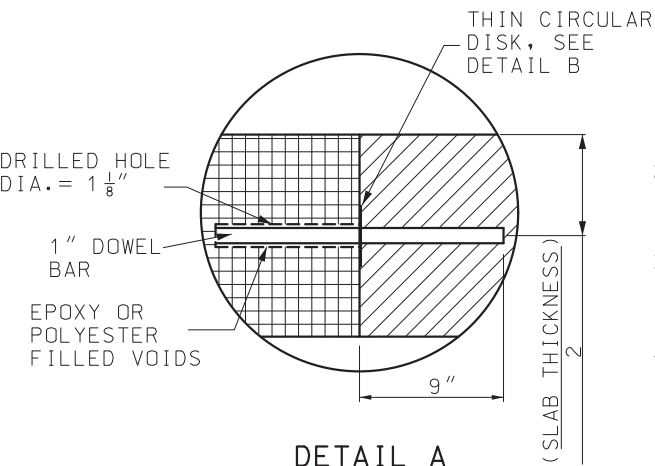
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TWO OR MORE LANES



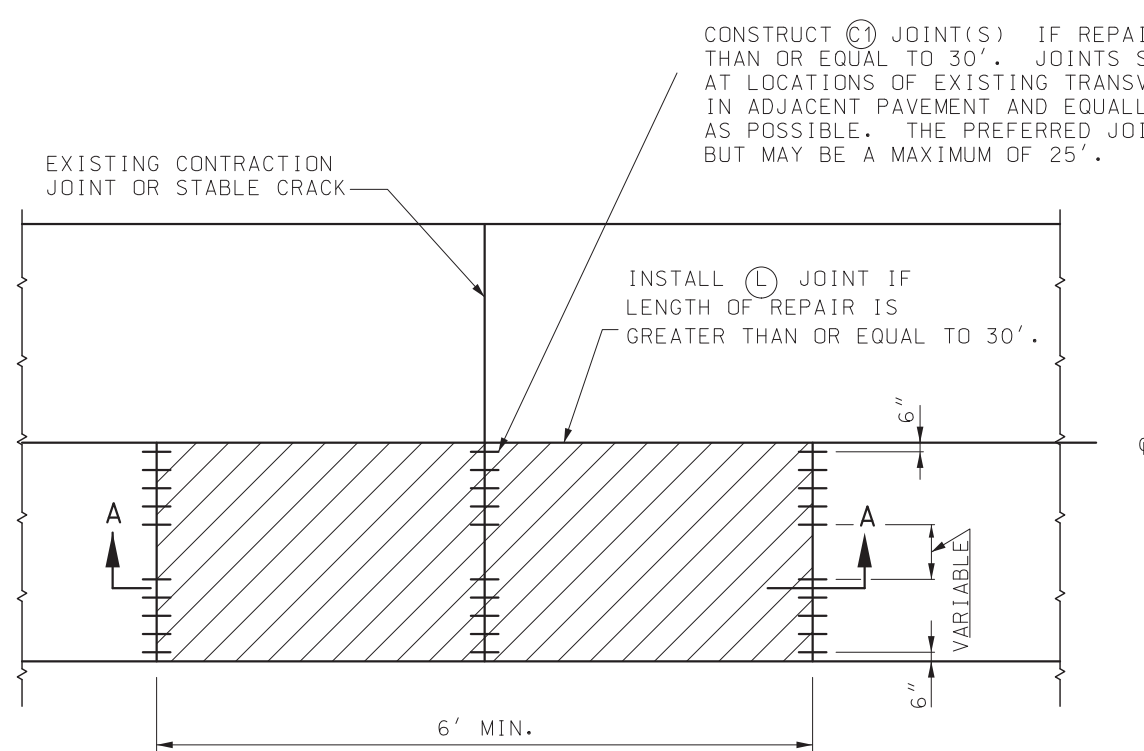
SECTION A-A



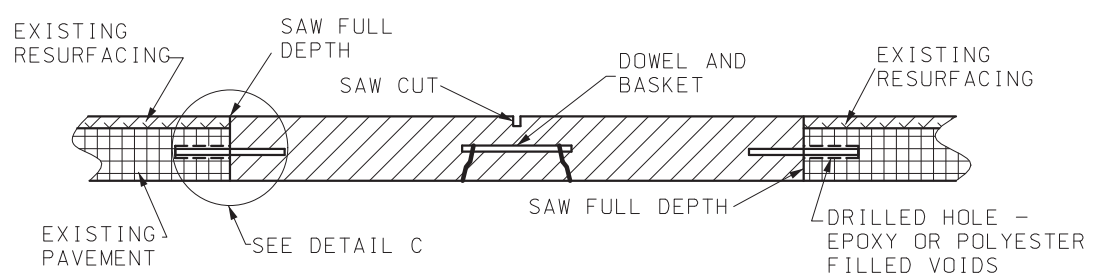
DETAIL A

1. SMOOTH EPOXY COATED DOWELS SHALL BE USED IN ALL FULL DEPTH PAVEMENT REPAIR TRANSVERSE JOINTS.
2. THE ANCHORING MATERIAL (EPOXY OR POLYESTER) SHALL BE PLACED TO THE BACK OF THE PREDRILLED HOLE BEFORE INSERTING THE DOWEL BAR.
3. THE DOWEL IS INSERTED INTO THE HOLE WITH A TWISTING MOTION SO THAT THE MATERIAL IN THE BACK OF THE HOLE IS FORCED UP AND AROUND THE BAR.
4. EXPOSED END OF DOWEL SHALL BE COATED WITH A THIN UNIFORM COAT OF GRAPHITE GREASE. DOWEL BASKET ASSEMBLIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD PLAN 502.10. IN LIEU OF GRAPHITE GREASE, THE DOWEL BAR BASKET SUPPLIER MAY PROVIDE COMPLETED BASKET UNITS PRE-DIPPED IN AN APPROVED BONDBREAKER.

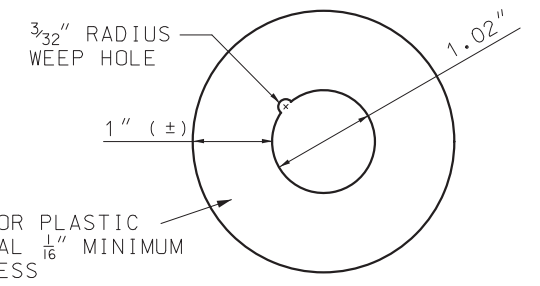
5. REPAIR ONLY ONE LANE AT A TIME.



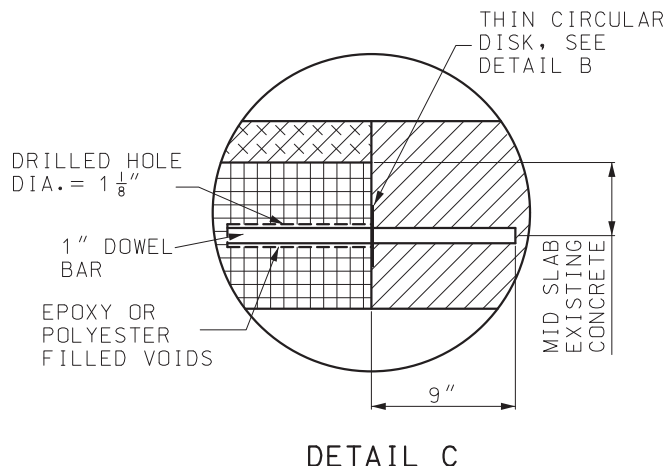
ONE LANE



SECTION A-A ALTERNATE WITH ASPHALT OVERLAY



DETAIL B
THIN CIRCULAR DISK


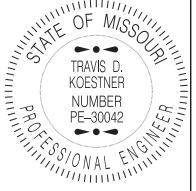


DETAIL C

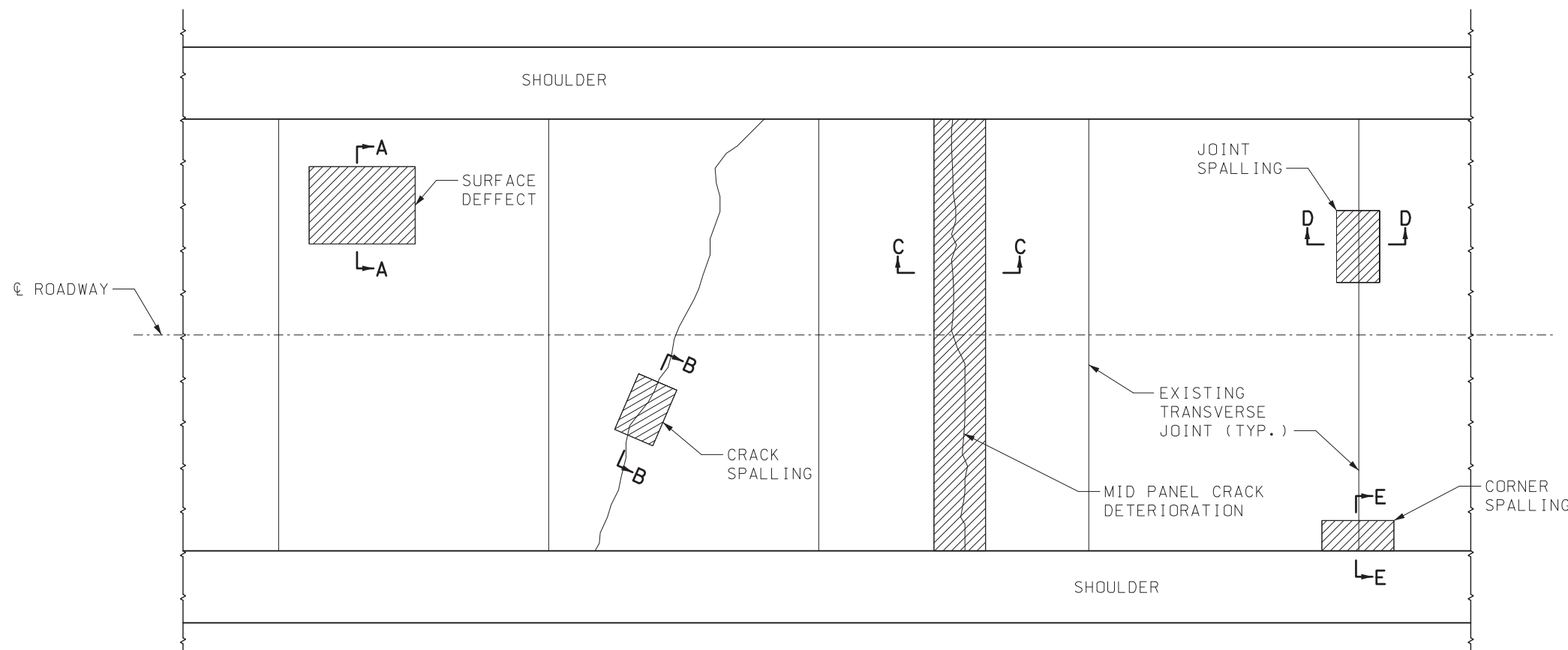
GENERAL NOTES:

ALL SAW CUTS SHALL BE MADE WITH A DIAMOND SAW EXCEPT THE CENTER RELIEF CUT.

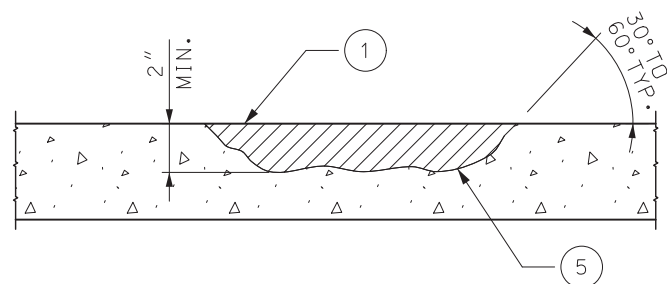
FOR DETAILS OF TYPE (C), (L) AND (L1) JOINTS. SEE STANDARD PLAN 502.05.

| | |
|---|--------------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | PAVEMENT REPAIR FULL DEPTH |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019 | 613.00T |
| SHEET NO. 1 OF 4 | |

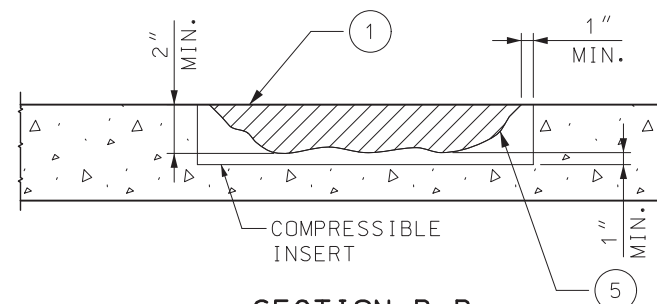
NON-REINFORCED AND REINFORCED PORTLAND CEMENT CONCRETE



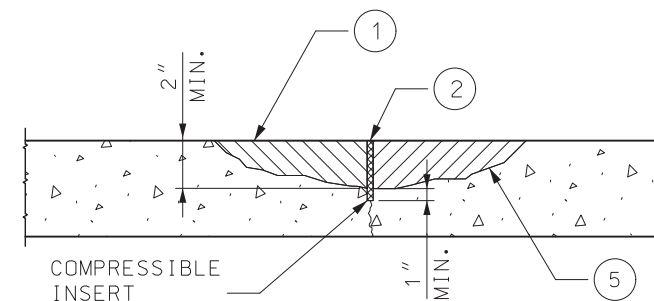
PLAN VIEW



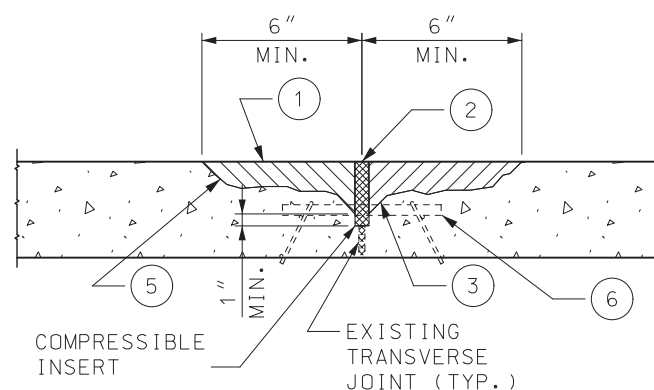
SECTION A-A



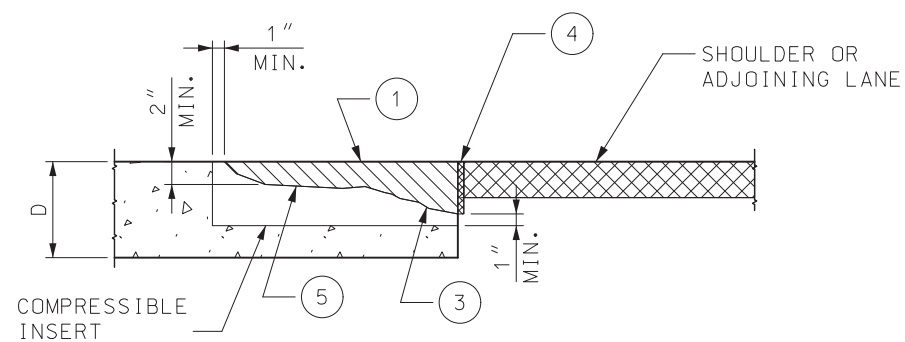
SECTION B-B



SECTION C-C



SECTION D-D

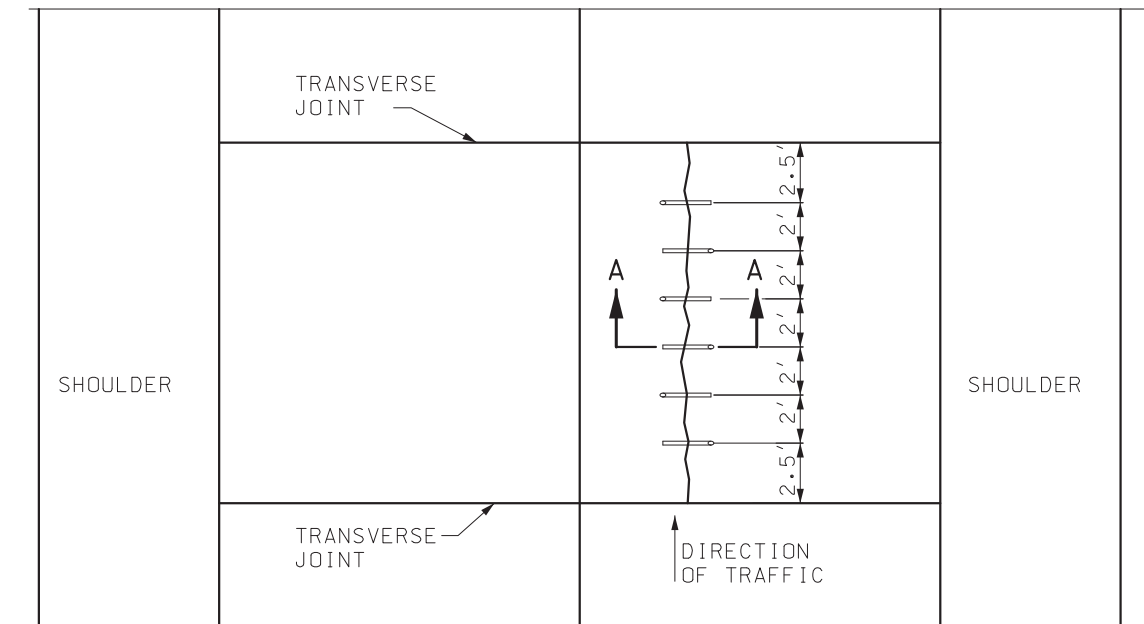


SECTION E-E

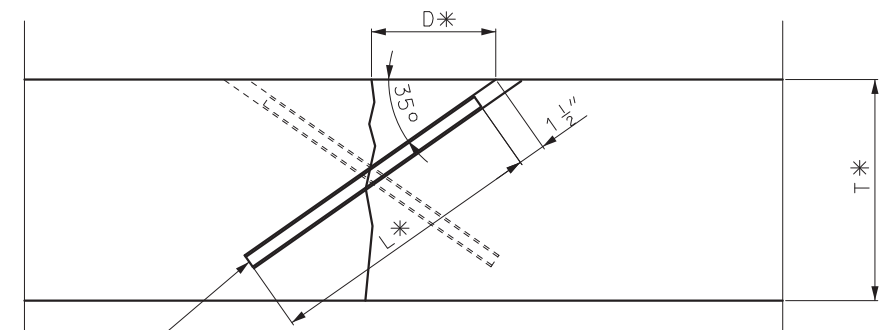
AREA TO BE REMOVED

- ① REMOVE ALL CONCRETE, TO LIMITS SHOWN, TO MAX. OF $\frac{1}{2}$ THE PAVEMENT DEPTH OR TOP OF DOWELS BY MILLING.
- ② PLACE COMPRESSIBLE INSERT IN JOINT OR CRACK. INSERT SHALL BE THICKNESS OF JOINT OR CRACK WIDTH, BUT NOT LESS THAN $\frac{1}{4}$ ".
- ③ CHIP VERTICAL REPAIR EDGES AT APPROXIMATE 1:1 SLOPE.
- ④ PLACE $\frac{1}{8}$ " MIN. COMPRESSIBLE INSERT ADJACENT TO LONGITUDINAL LANE OR SHOULDER JOINT.
- ⑤ EXPOSED SURFACE SHALL BE CLEANED BY SANDBLASTING OR SHOTBLASTING.
- ⑥ EXPOSED SURFACE OF DOWEL BARS SHALL BE COATED WITH AN APPROVED BONDBREAKER.

| | |
|--|--|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | PAVEMENT REPAIR PARTIAL DEPTH CLASS A |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019 | 613.00T |
| SHEET NO. 2 OF 4 | |



CROSS STITCHING PLAN



#6 EPOXY REBAR
CROSS STITCH
BAR

* SEE TABLE

| | | | | | | |
|---|-----------------------|-------|-------|--------|-------|-------|
| T | SLAB THICKNESS (IN) | 8 | 9 | 10 | 11 | 12 |
| D | DISTANCE TO HOLE (IN) | 5 3/4 | 6 1/2 | 7 1/4 | 8 1/2 | 8 1/2 |
| L | LENGTH OF BAR (IN) | 8 1/2 | 11 | 12 1/2 | 14 | 16 |

SECTION A-A

GENERAL NOTES:

AT EACH REPAIR LOCATION, HOLES SHALL BE DRILLED AT 35° ANGLES TO THE PAVEMENT SURFACE, PERPENDICULAR TO THE CRACK. THE DRILL BIT DIAMETER SHALL NOT EXCEED 1 1/8".

DRILLING SHALL ALTERNATE BACK AND FORTH ON EITHER SIDE OF THE LONGITUDINAL JOINT FROM HOLE TO HOLE.

DRILLED HOLES SHALL NOT PENETRATE THROUGH THE SLAB BOTTOM.

DRILLED HOLES SHALL BE CLEANED OF LOOSE DEBRIS AND DUST. EPOXY OR POLYESTER BONDING AGENTS FOR DOWELS, MEETING THE MATERIAL REQUIREMENTS OF SECTION 1039, SHALL BE INJECTED OR POURED INTO EACH HOLE. A CROSS-STITCH BAR SHALL BE INSERTED IN EACH HOLE SUCH THAT THE EPOXY MATERIAL IS EVENLY DISTRIBUTED AROUND THE BAR AND EXTRUDING FROM THE SURFACE OPENING. EACH BAR SHALL BE INSERTED FAR ENOUGH TO ALLOW 1 1/2" OF COVER AS SHOWN IN THE PROFILE DETAIL.

THE SURFACE SHALL HAVE ALL EXCESS EPOXY REMOVED AND HAVE A FLUSH FINISH.

GENERAL NOTES:



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

TRAVIS D. KOESTNER
NUMBER PE-30042

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
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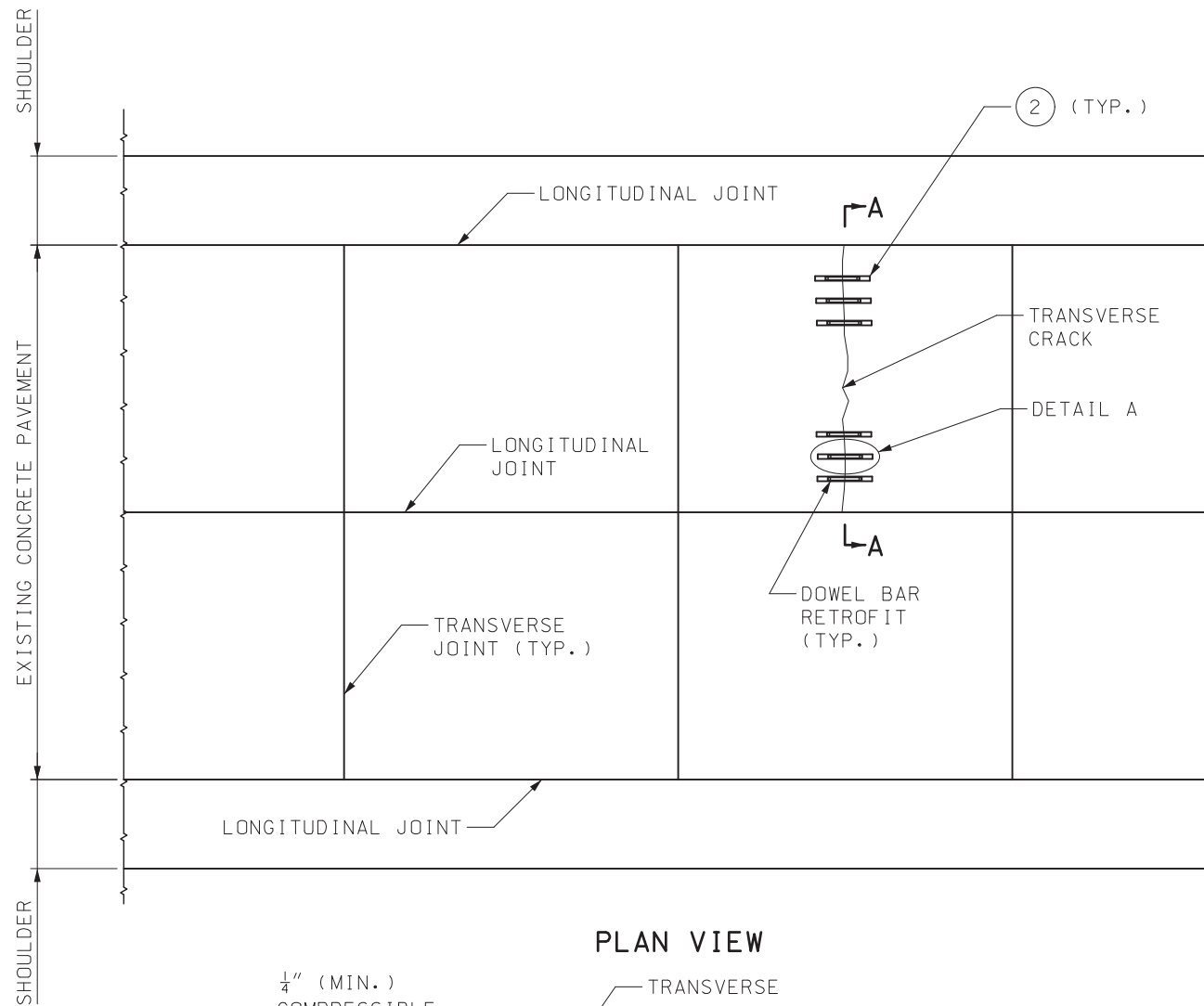
PAVEMENT REPAIR
CROSS STITCHING

DATE EFFECTIVE: 01/01/2020
DATE PREPARED: 10/17/2019

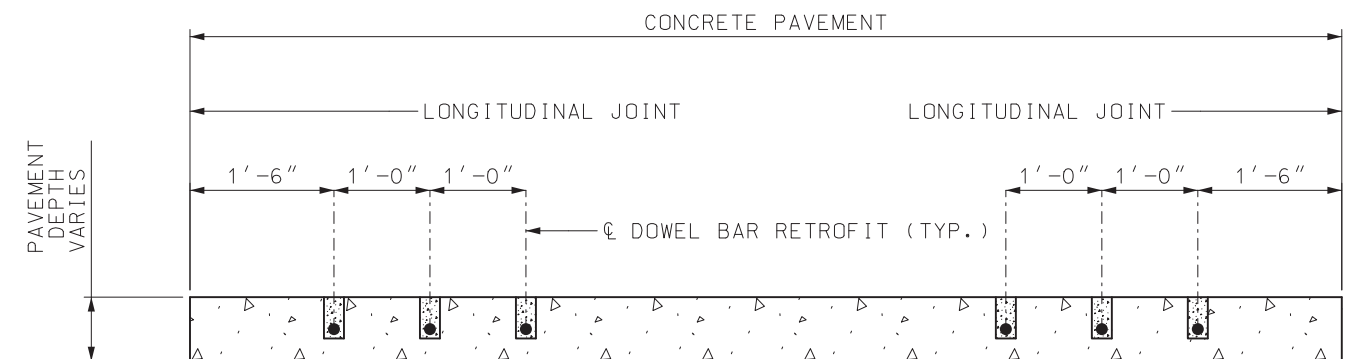
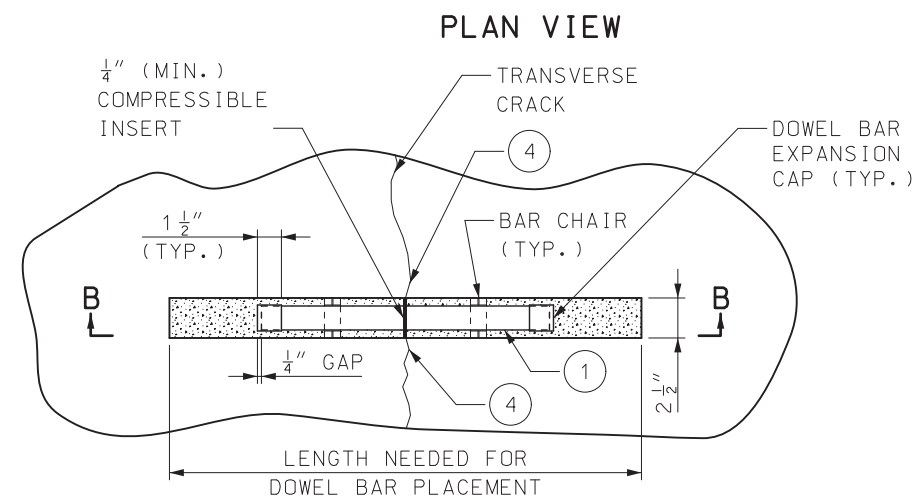
613.00T

SHEET NO.
3 OF 4

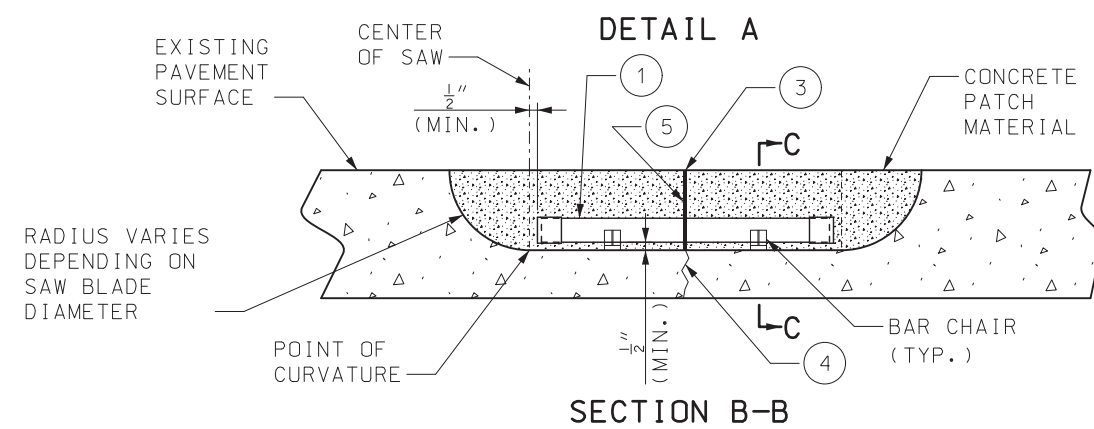
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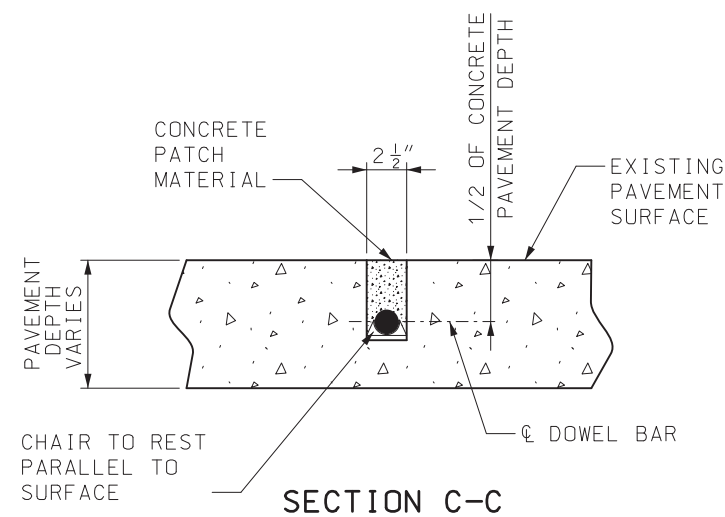
- ① 1 1/2" DIAMETER DOWEL BAR X 18" LENGTH.
- ② DOWEL BAR SLOTS SHALL BE PARALLEL TO ROADWAY.
- ③ TOP OF COMPRESSIBLE INSERT SHALL BE FLUSH WITH PAVEMENT SURFACE.
- ④ CRACK PERIMETER IN SLOT SHALL BE SEALED WITH SILICONE.
- ⑤ COMPRESSIBLE INSERT SHALL BE PLACED AT MIDDLE OF DOWEL BAR.



SECTION A-A

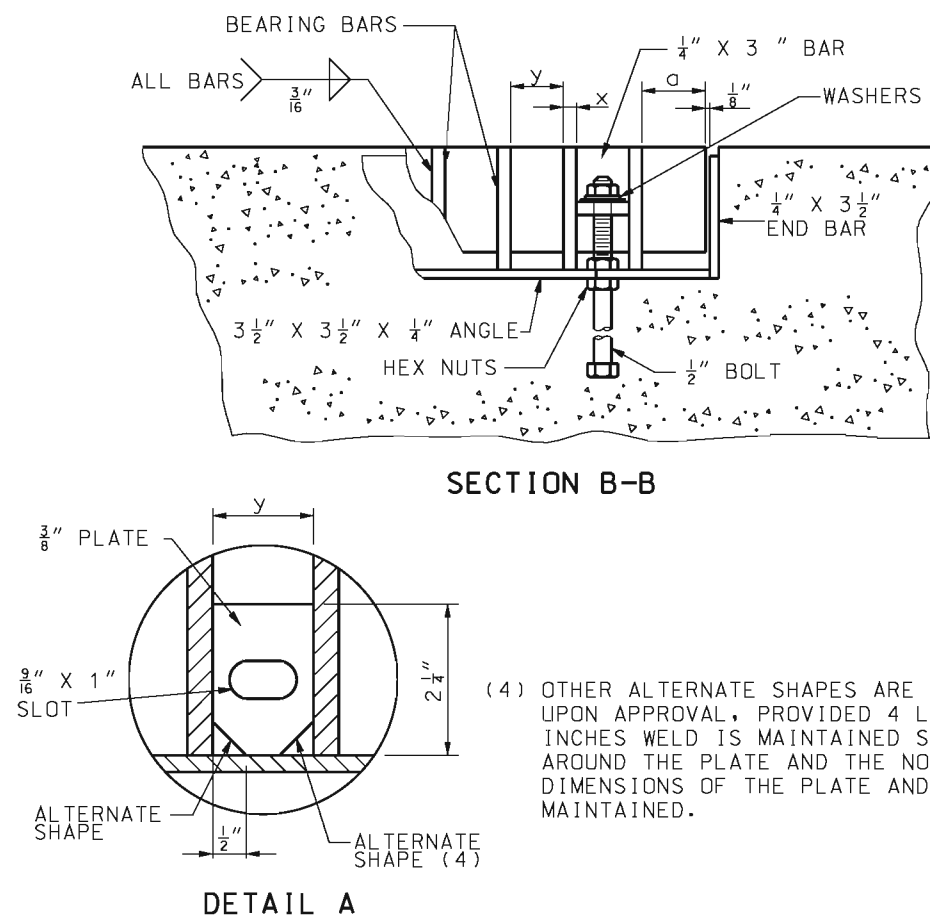
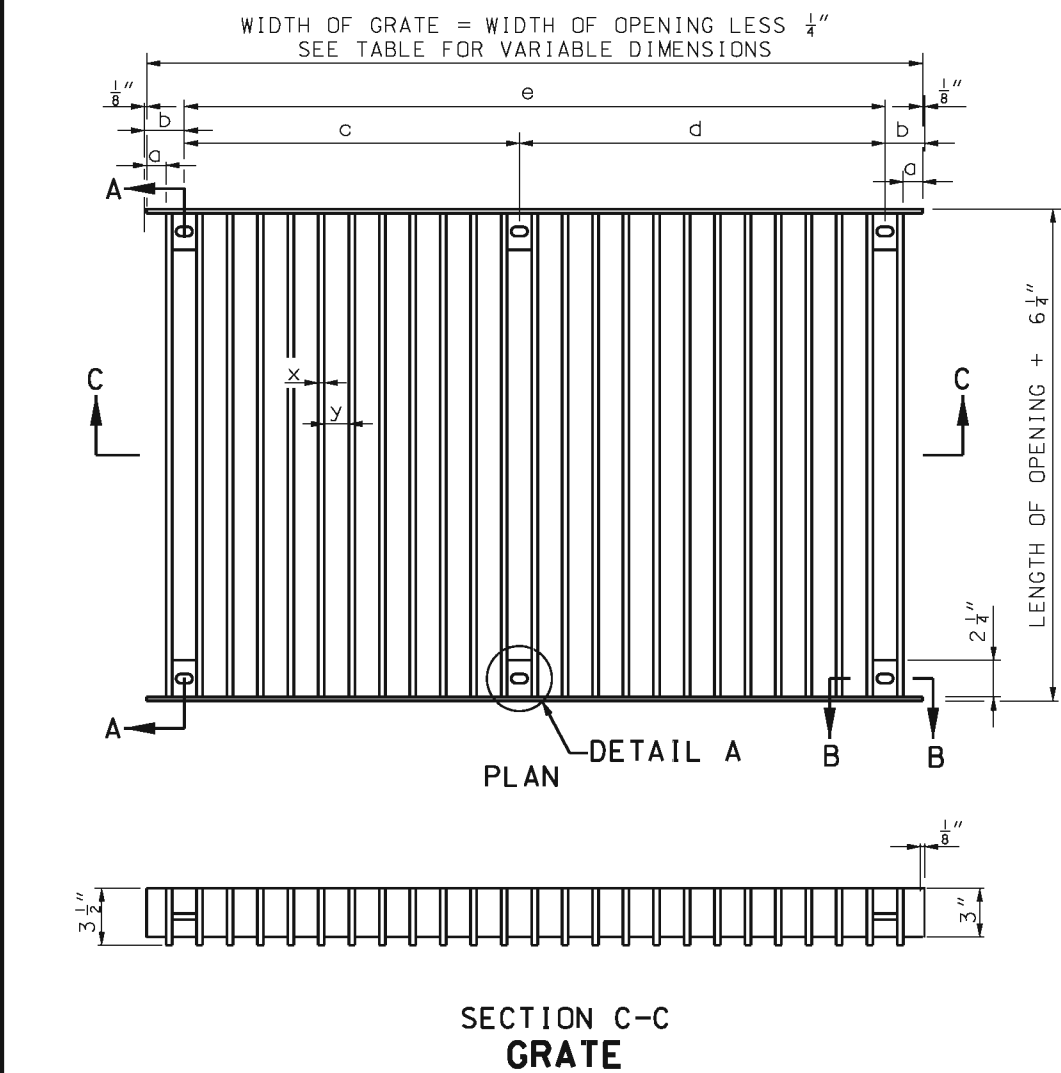
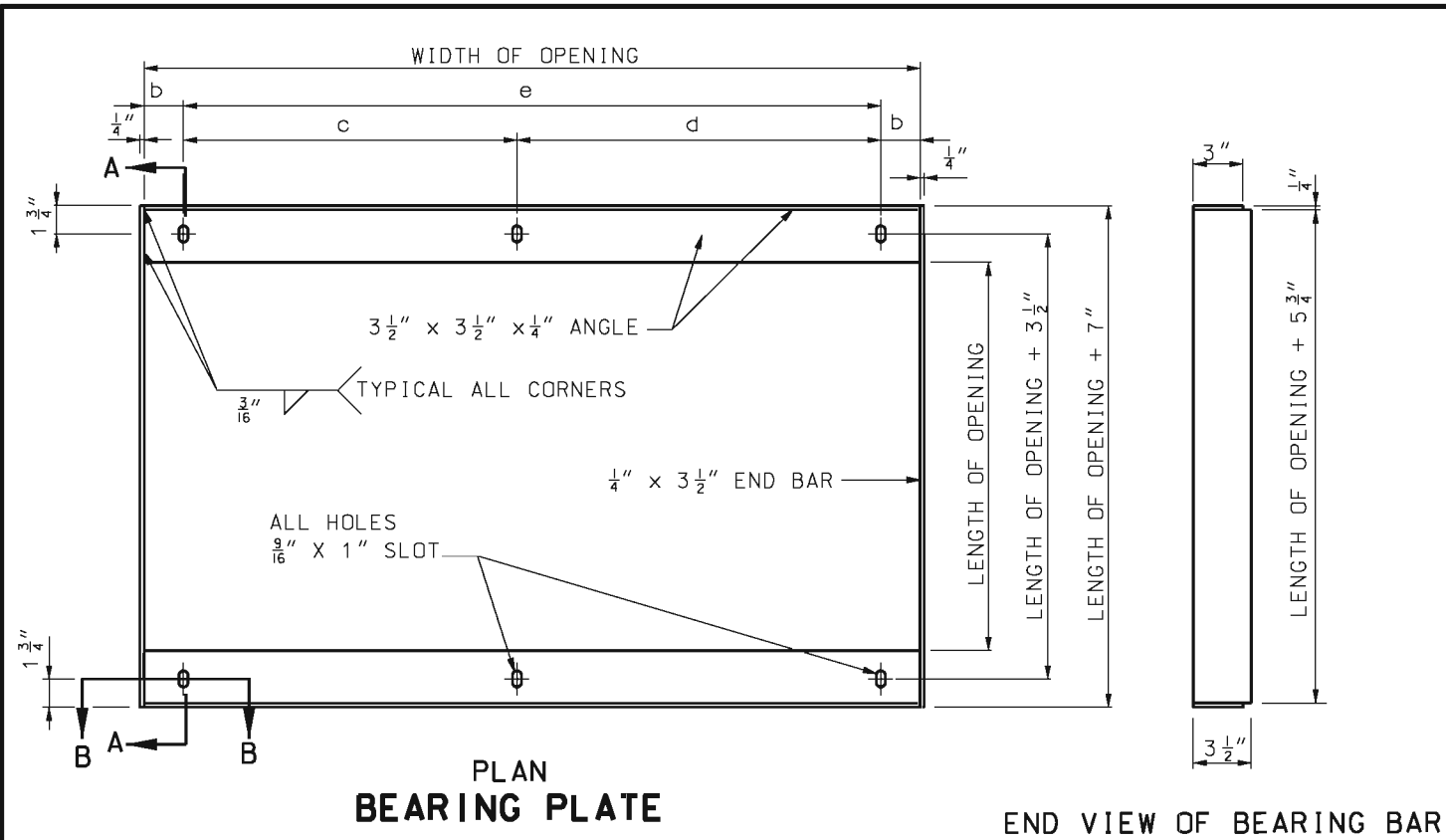


SECTION B-B



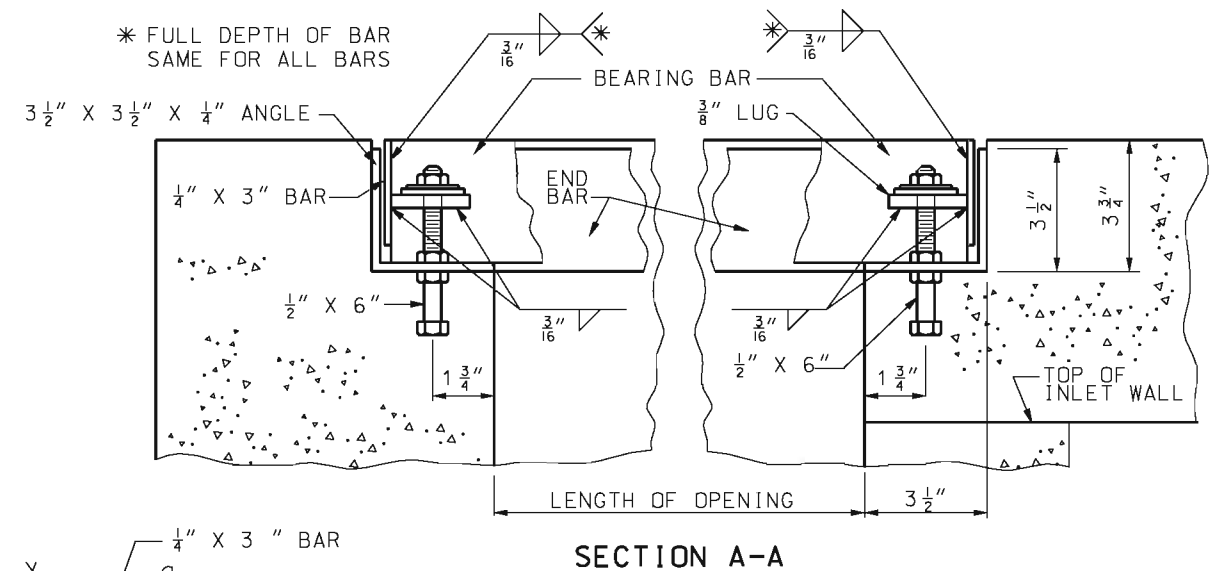
SECTION C-C

| | |
|--|---|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | PAVEMENT REPAIR DOWEL BAR RETROFIT |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019 | 613.00T |
| SHEET NO. 4 OF 4 | |



| WEIGHT AND DIMENSIONS DATA | | | | | | | | | | | | |
|----------------------------|--------|-----------------------|----------------|----|---------------------|--------|-------------------|--------------------|---------------------|-------|---------------------|---|
| OPENING | | WEIGHT (1) LBS. | BEARING BARS | | | | DIMENSIONS | | | | | REMARKS |
| WIDTH | LENGTH | | x | y | LENGTH | NUMBER | a | b | c | d | e | |
| 3'-0" | 2'-0" | 190 | $\frac{3}{8}"$ | 3" | 2'-5 $\frac{3}{4}"$ | 11 | $1\frac{13}{16}"$ | 2 $\frac{13}{16}"$ | | | 2'-6 $\frac{3}{8}"$ | USE WITH TYPE S-1 INLETS AND TYPE S HEADWALLS |
| 3'-0" | 3'-0" | 330 | $\frac{5}{8}"$ | 3" | 3'-5 $\frac{3}{4}"$ | 10 | 1 $\frac{1}{4}"$ | 3 $\frac{1}{2}"$ | | | 2'-5" | |
| 5'-0" | 2'-0" | 300 | $\frac{3}{8}"$ | 3" | 2'-5 $\frac{3}{4}"$ | 18 | 1" | 3" | 2'-3" | 2'-3" | | |
| 5'-0" | 3'-0" | 550 | $\frac{5}{8}"$ | 3" | 3'-5 $\frac{3}{4}"$ | 17 | $\frac{9}{16}"$ | 2 $\frac{13}{16}"$ | 2'-1 $\frac{3}{8}"$ | 2'-5" | | |
| 3'-1" | 2'-1" | 200 | $\frac{3}{8}"$ | 3" | 2'-6 $\frac{3}{4}"$ | 11 | 1 $\frac{5}{16}"$ | 3 $\frac{5}{16}"$ | | | 2'-6 $\frac{3}{8}"$ | USE WITH TYPE S-2 AND TYPE S-3 INLETS ONLY |
| 3'-1" | 3'-1" | 340 | $\frac{5}{8}"$ | 3" | 3'-6 $\frac{3}{4}"$ | 10 | 1 $\frac{3}{4}"$ | 4" | | | 2'-5" | |
| 5'-1" | 2'-1" | 310 | $\frac{3}{8}"$ | 3" | 2'-6 $\frac{3}{4}"$ | 18 | 1 $\frac{1}{2}"$ | 3 $\frac{1}{2}"$ | 2'-3" | 2'-3" | | |
| 5'-1" | 3'-1" | 560 | $\frac{5}{8}"$ | 3" | 3'-6 $\frac{3}{4}"$ | 17 | 1 $\frac{1}{16}"$ | 3 $\frac{5}{16}"$ | 2'-1 $\frac{3}{8}"$ | 2'-5" | | |

(1) THE WEIGHT OF THE GRATE AND BEARING PLATE INCLUDES THE BOLTS, NUTS, AND WASHERS AND SHALL BE AS SHOWN WITH A TOLERANCE OF 5 PERCENT.



GENERAL NOTES:

WHEN BOLTS ARE CUT IN THE FIELD, THREADS MUST BE CLEANED TO PERMIT THE FINAL NUT TO RUN FREELY ON THE BOLT.

THE WELDING REQUIREMENTS SHOWN ON THIS DRAWING ARE FOR PAINTED GRATES AND BEARING PLATES. IF GALVANIZED, ALL TIGHTLY CONTACTING SURFACES SHALL BE COMPLETELY SEALED, ON ALL SIDES BY WELDING, PRIOR TO GALVANIZING.

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GRATES AND BEARING PLATES

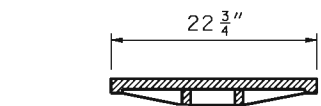
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DATE PREPARED: 8/21/2009

614.10T

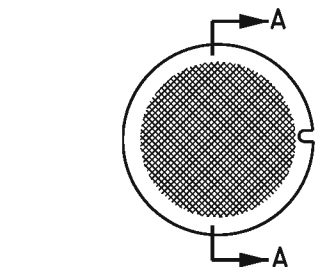
SHEET NO.
1 OF 1

(4) OTHER ALTERNATE SHAPES ARE ALLOWED, UPON APPROVAL, PROVIDED 4 LINEAR INCHES WELD IS MAINTAINED SYMETRICALLY AROUND THE PLATE AND THE NOMINAL DIMENSIONS OF THE PLATE AND SLOT ARE MAINTAINED.

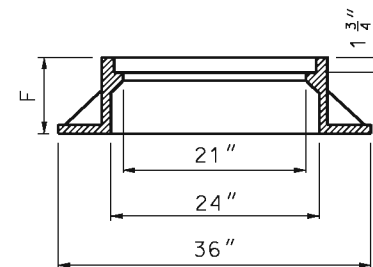
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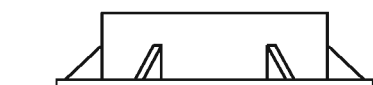
SECTION A-A



PLAN

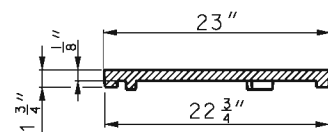


SECTION B-B

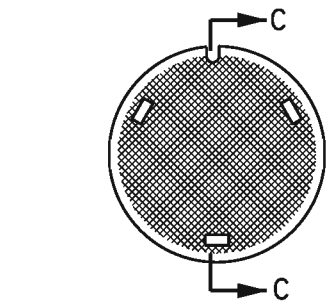


ELEVATION
TYPE 1A AND 1B

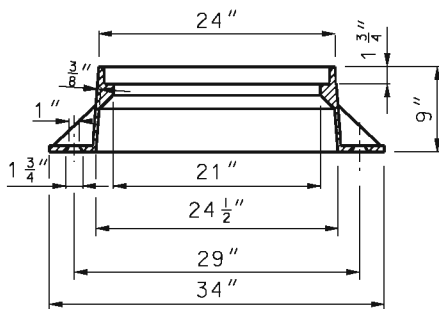
APPROXIMATE WEIGHT OF
FRAME AND COVER
TYPE 1A 540 LBS.
TYPE 1B 570 LBS.



SECTION C-C



PLAN

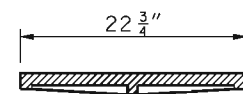


SECTION D-D

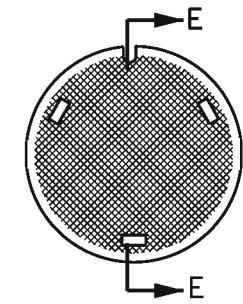


ELEVATION
TYPE 1C

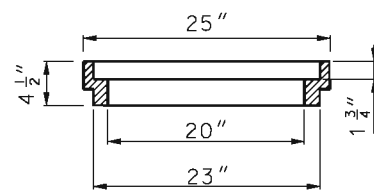
APPROXIMATE WEIGHT OF
FRAME AND COVER 290 LBS.



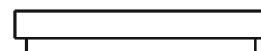
SECTION E-E



PLAN

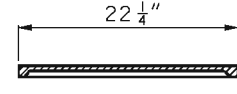


SECTION F-F

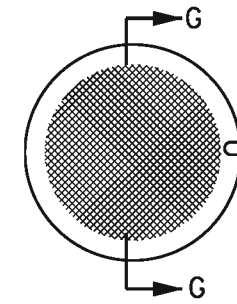


ELEVATION
TYPE 2

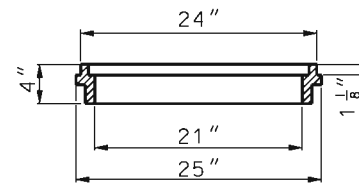
APPROXIMATE WEIGHT OF
FRAME AND COVER 250 LBS.



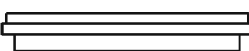
SECTION G-G



PLAN

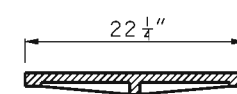


SECTION H-H

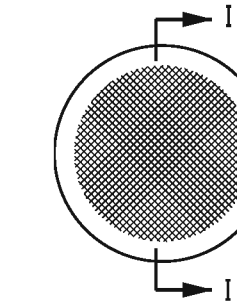


ELEVATION
TYPE 3

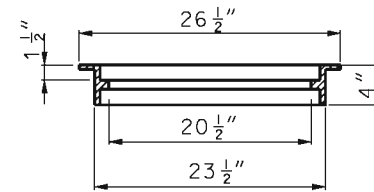
APPROXIMATE WEIGHT OF
FRAME AND COVER 115 LBS.



SECTION I-I



PLAN



SECTION J-J



ELEVATION
TYPE 4

APPROXIMATE WEIGHT OF
FRAME AND COVER 160 LBS.

GENERAL NOTES:

TYPE 1A:
WHEN "P" (PAVEMENT THICKNESS) IS 8" USE MANHOLE
FRAME WITH 9" HEIGHT (F) APPROXIMATE WEIGHT OF
FRAME AND COVER, 540 LBS., CLASS 35 CASTING.

TYPE 1B:
WHEN "P" (PAVEMENT THICKNESS) IS 9" OR 10", USE
MANHOLE FRAME WITH 10" HEIGHT (F) APPROXIMATE
WEIGHT OF FRAME AND COVER, 570 LBS., CLASS 35
CASTING.

TYPE 1C:
TYPE 1C MANHOLE FRAME AND COVER WILL BE ACCEPTED AS
AN ALTERNATE TO TYPE 1A OR TYPE 1B. APPROXIMATE
WEIGHT OF FRAME AND COVER, 290 LBS..

FOR "P" GREATER THAN 10" ADJUSTING RINGS COMBINED
WITH MANHOLE FRAMES WITH "F" EQUAL TO 9" OR 10"
SHALL BE USED TO MATCH THE PAVEMENT THICKNESS.

THE PRICE BID FOR MANHOLE FRAME AND COVER SHALL
INCLUDE THE NUMBER OF ADJUSTING RINGS REQUIRED TO
MATCH PAVEMENT THICKNESS.

WHEN SPECIFIED, USE A LOCK TYPE FRAME AND COVER
WITH A MINIMUM OF 3 LOCK BLOCKS AND BOLTS.

MANHOLE ADJUSTING RINGS SHALL BE SECURED TO EITHER
THE FRAME OR PAVEMENT TO PREVENT MOVEMENT UNDER
TRAFFIC.

A CHECKERED DESIGN TOP SHALL BE FURNISHED.



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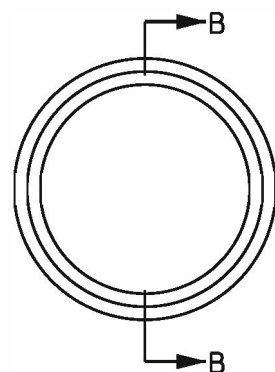
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MANHOLE
FRAMES AND COVERS

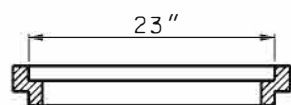
DATE EFFECTIVE: 03/01/1996
DATE PREPARED: 8/21/2009

614.30E

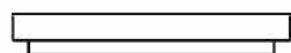
SHEET NO.
1 OF 2



PLAN

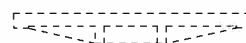


SECTION B-B



ELEVATION

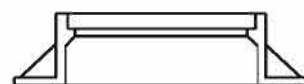
ADJUSTING RING
SOLID OR ADJUSTABLE



COVER

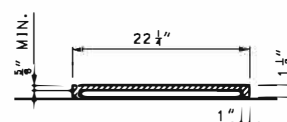


ADJUSTING RING

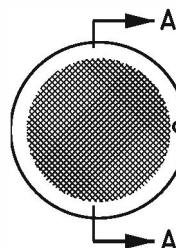


FRAME

INSTALLATION
DETAILS



SECTION A-A



APPROXIMATE WEIGHT OF
FRAME AND COVER 150 LBS.

ALTERNATE
TYPE 4 COVER



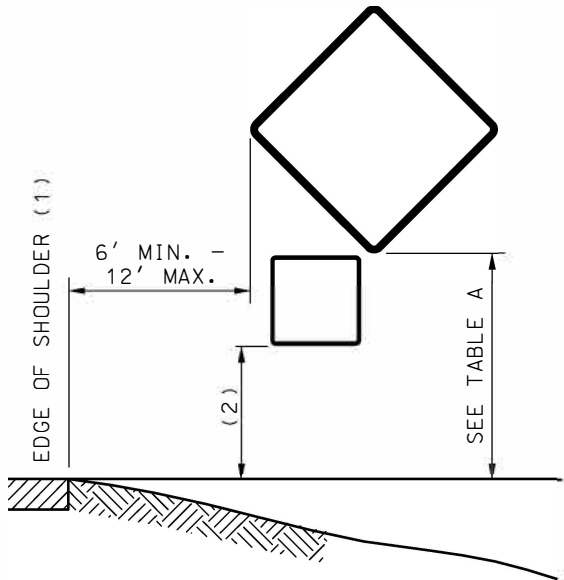
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|--|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | MANHOLE FRAMES AND COVERS | |
| | DATE EFFECTIVE: 03/01/1996 DATE PREPARED: 8/21/2009 | 614.30E |

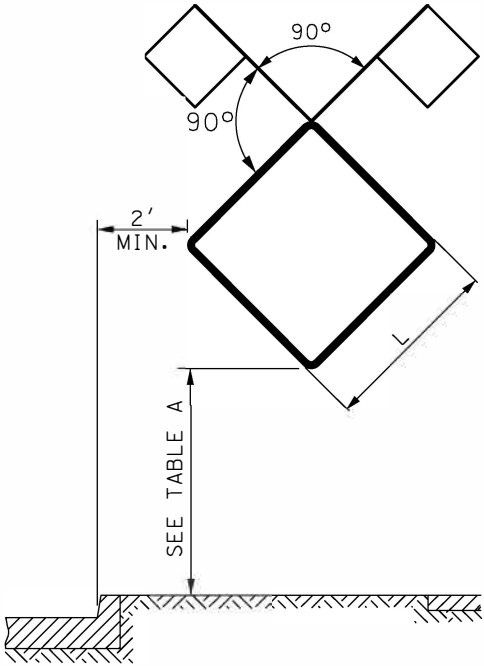
TABLE A
WORK ZONE SIGN MOUNTING REQUIREMENTS

| TYPE | SIGN SUPPORT | SIGN SUBSTRATE | MINIMUM MOUNTING HEIGHT(3) | USAGE LIMITATIONS | COMMENTS |
|--------------------|---|-------------------|---|---|--|
| POST | PERFORATED SQUARE STEEL TUBE U-CHANNEL WOOD | RIGID | 5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS | NONE | POSTS SHALL BE FREE OF ANY BRACING AND EXTEND NO FURTHER ABOVE THE SIGN EXCEPT AS NEEDED FOR WARNING LIGHT ATTACHMENT. FOR DETAILS OF POST INSTALLATION DETAILS SEE SHEET NO. 2 OF 9. GALVANIZATION OF POSTS WILL NOT BE REQUIRED. |
| TYPE 1 PORTABLE | SKID FOLD-UP STAND | RIGID | 5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS | PERMITTED ONLY WHERE POST MOUNTING IS NOT FEASIBLE. | SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 TEST LEVEL 3 AND MAY BE PLACED ADJACENT TO OR WITHIN THE ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF DESIGNATED TRAVELED WAY, IS MAINTAINED. |
| TYPE 2 PORTABLE | EASEL FOLD-UP STAND SELF-DRIVING POST TYPE III MOVABLE BARRICADE SKID | FLEXIBLE RIGID | 12"(4) | PERMITTED ONLY FOR INSTALLATION UP TO 3 DAYS(5). WHERE SIGNS ARE OBSCURED BY OTHER OBJECTS (I.E., TRAFFIC CONTROL DEVICES, PARKED VEHICLES, BARRIER, VEGETATION, ETC.) OR INSTALLED ON MULTI-LANE UNDIVIDED FACILITIES OR MULTI-LANE DIVIDED FACILITIES WITH 3 OR MORE LANES IN ONE DIRECTION, MOUNTING HEIGHTS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS. | SYSTEMS SHALL COMPLY WITH CRASH TEST REQUIREMENTS OF NCHRP 350 TEST LEVEL 3 AND MAY BE PLACE ADJACENT TO OR WITHIN ROADWAY PROVIDED A MINIMUM LATERAL CLEARANCE OF 3 FEET, MEASURED HORIZONTALLY FROM THE EDGE OF THE SIGN TO THE EDGE OF THE DESIGNATED TRAVELED WAY, IS MAINTAINED. |
| BARRIER | CONCRETE TRAFFIC BARRIER GUARDRAIL | FLEXIBLE RIGID | 5' RURAL UNDIVIDED HIGHWAYS 7' RURAL DIVIDED HIGHWAYS 7' URBAN HIGHWAYS | PERMITTED ONLY WHERE LONGITUDINAL BARRIER IS PRESENT. | SYSTEMS SHALL PROVIDE POSITIVE CONNECTION TO THE BARRIER AND MINIMIZE POTENTIAL FOR VEHICLE SNAGGING. |
| VEHICLE | PAVEMENT MARKING EQUIPMENT PILOT CAR PROTECTIVE VEHICLE | FLEXIBLE RIGID | 48" (6) | PERMITTED ONLY IN PILOT CAR OR MOVING OPERATIONS. | |

- (3) MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF THE PAVEMENT.
(4) MOUNTING HEIGHTS FOR REGULATORY AND GUIDE SIGNS SHALL BE AS SPECIFIED FOR POST-MOUNTED SIGNS.
(5) SIGNS MOUNTED ON TYPE III BARRICADES, GORE EXIT SIGN, AND SIGNS FOR CROSWALK/SIDEWALKCLOSURES MAY BE LEFT IN PLACE FOR MORE THAN 3 DAYS.
(6) DEVIATIONS AS APPROVED BY THE ENGINEER.



- (1) EDGE OF TRAVELED WAY WHERE THERE IS NO PAVED OR STABILIZED SHOULDER.
(2) ONE-FOOT LESS THAN MOUNTING HEIGHT NOTED IN TABLE A.



HEIGHT AND LATERAL LOCATIONS FOR
POST AND PORTABLE SIGN MOUNTING


GENERAL NOTES:

LONGITUDINAL SPACING OF SIGNS SHOWN IN THE PLANS ARE PREFERRED MINIMUMS, BUT MAY BE ADJUSTED TO MEET EXISTING FIELD CONDITIONS WITH APPROVAL FROM THE ENGINEER.

SIGNS SHALL NOT BE MOUNTED IN OR ON CHANNELIZERS.

ALL POSTS AND SIGNS SHALL BE INSTALLED AND MAINTAINED IN A PLUMB POSITION.


CONSTRUCTION SIGNS SHALL NOT BE LOCATED ON SIDEWALKS, BICYCLE LANES, OR AREAS DESIGNATED FOR PEDESTRIAN OR BICYCLE TRAFFIC.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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**TEMPORARY
TRAFFIC CONTROL DEVICES
SIGN MOUNTING REQUIREMENTS**

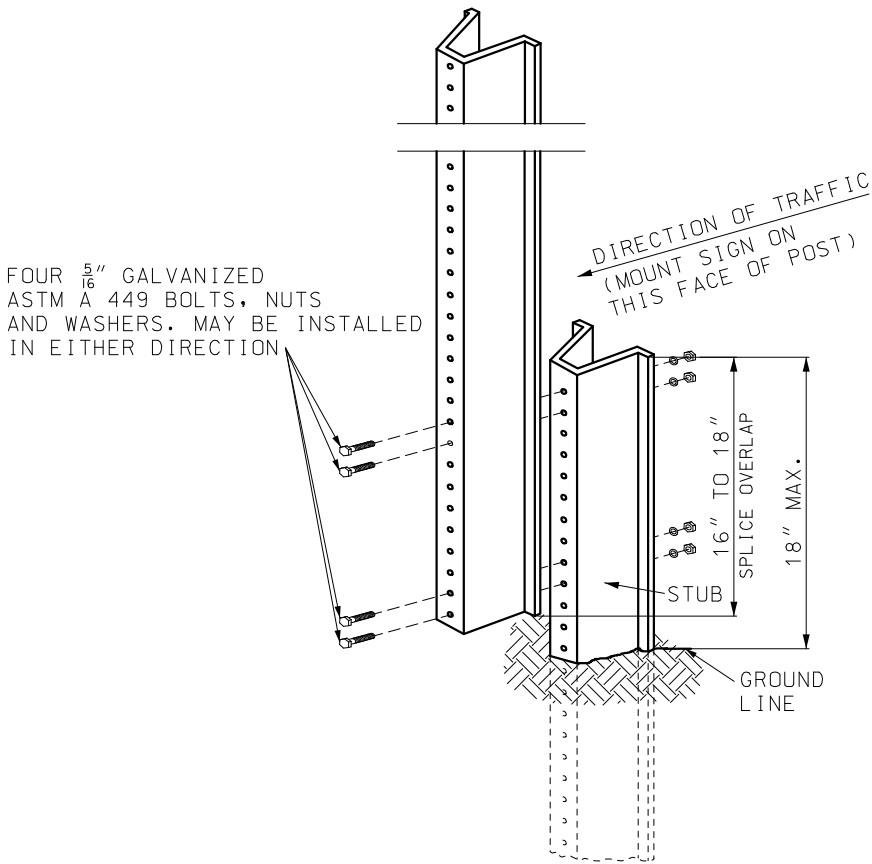


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DATE EFFECTIVE: 07/01/2020
DATE PREPARED: 4/29/2020

616.10AW

SHEET NO.
1 OF 9



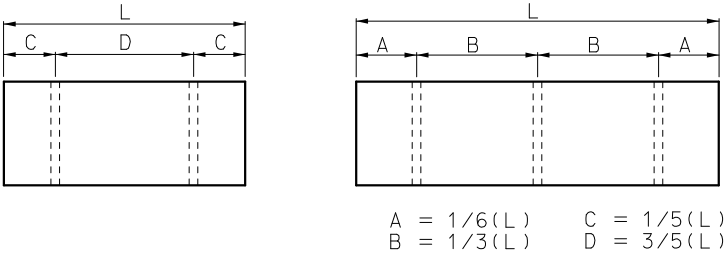
U-CHANNEL POST DETAIL

USE OF SPLICE IS OPTIONAL.

SPLICE OVERLAP SHALL BE POSITION ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

* IF A PLAQUE IS USED, NEITHER THE SIGN NOR PLAQUE SHALL BE POSITIONED WITHIN THE SPLICE OVERLAP AREA.

ONLY ONE SPLICE WILL BE ALLOWED PER POST.

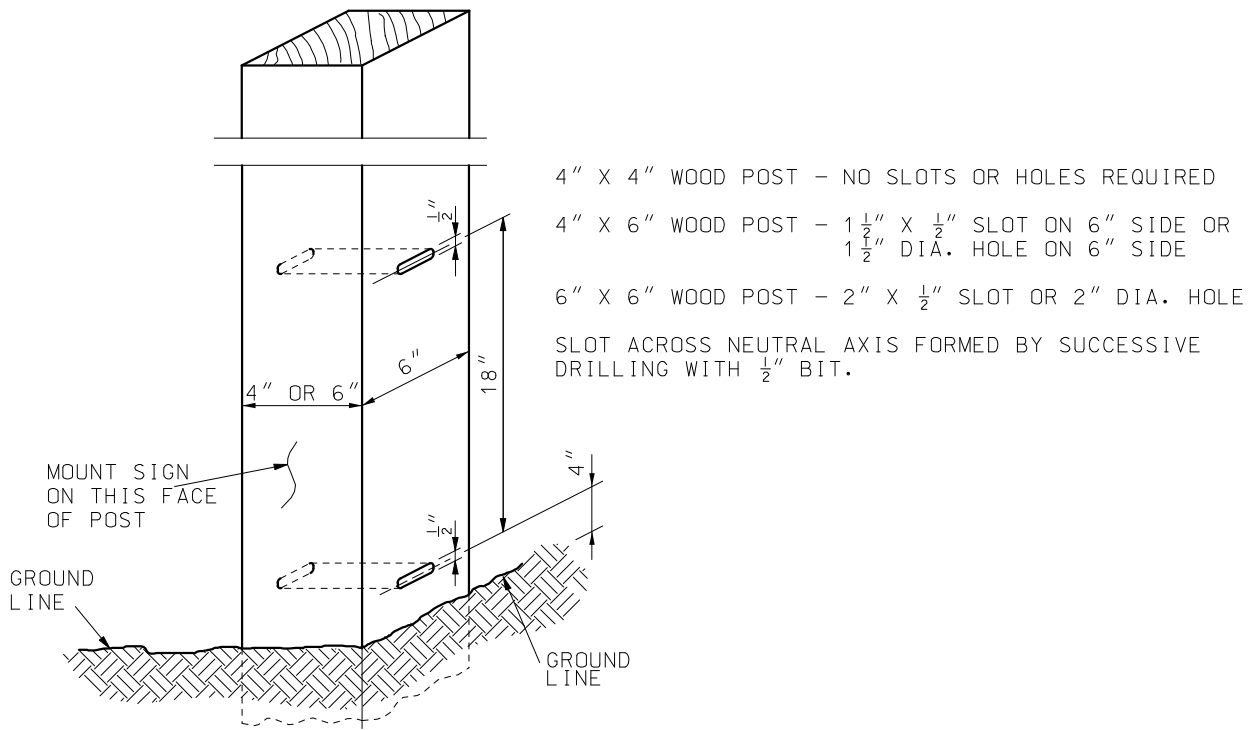


POST SPACING

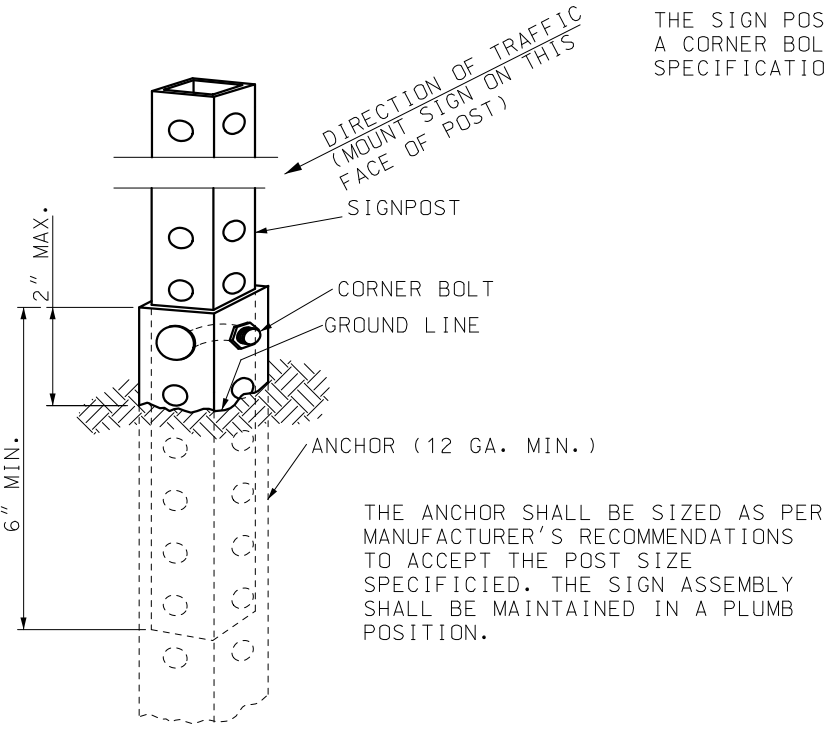
| POST TYPE | | | |
|--------------------|------------------|------------------------------|------------------------------------|
| SIGN AREA (SQ.FT.) | U-CHANNEL | WOOD | PERFORATED SQUARE STEEL TUBING |
| ≤ 10 | 1 - 3.0 LB./FT.* | 1 - 4" X 4"* | 1 - 2" 12 GA.* |
| > 10 ≤ 16 | 2 - 3.0 LB./FT. | 2 - 4" X 4"* 1 - 4" X 6"* | 2 - 2" 12 GA. 1 - 2 1/2" 12 GA. |
| > 16 ≤ 24 | 2 - 3.0 LB./FT. | 2 - 4" X 6" | 3 - 2" 12 GA.** |
| > 24 ≤ 32 | 3 - 3.0 LB./FT. | 2 - 4" X 6" | N/A |
| > 30 ≤ 50 | N/A | 2 - 6" X 6" | N/A |

* SIGNS GREATER THAN 4 FEET IN WIDTH, EXCEPT DIAMOND SHAPE SIGNS, REQUIRE TWO POSTS.

** REQUIRES SLIP BASE PER MANUFACTURER'S RECOMMENDATION.



WOOD POST DETAIL



PERFORATED SQUARE STEEL TUBE POST DETAIL


THE SIGN POST MAY BE ATTACHED TO THE ANCHOR WITH A CORNER BOLT OR STRAIGHT BOLT PER MANUFACTURER'S SPECIFICATION.

GENERAL NOTES:

ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET.

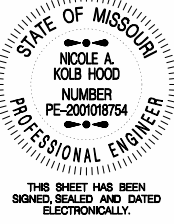
SIGN INSTALLATION DETAILS SHOWN SHALL APPLY TO ALL POSTS IN A MULTI-POST INSTALLATION.

AT THE ENGINEERS DISCRETION A FLUORESCENT PAINT SHALL BE APPLIED HEAVILY TO BOTH SIDES OF U-CHANNEL POST STUB FOR A LENGTH OF AT LEAST 6 INCHES BELOW THE TOP OF THE STUB.



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STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER
PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
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ELECTRONICALLY.

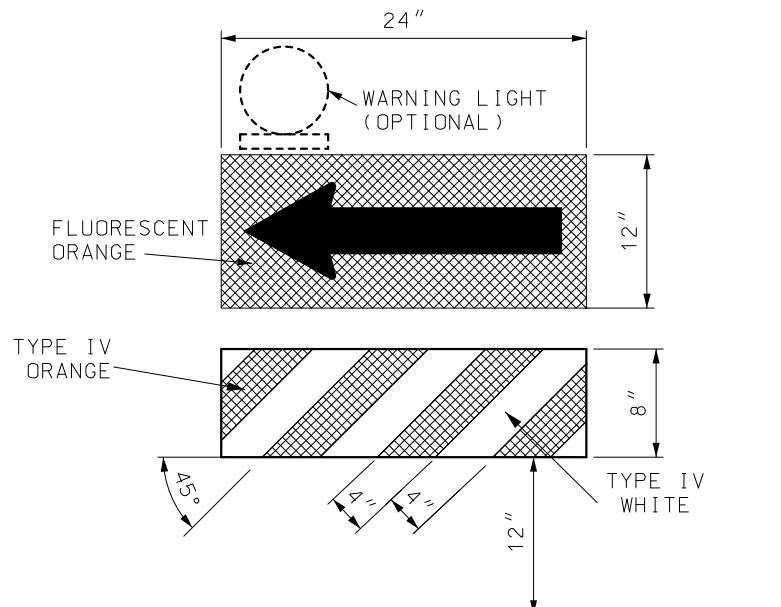
TEMPORARY
TRAFFIC CONTROL DEVICES
POST INSTALLATION DETAILS

DATE EFFECTIVE: 07/01/2020
DATE PREPARED: 4/29/2020

616.10AW

SHEET NO.
2 OF 9

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

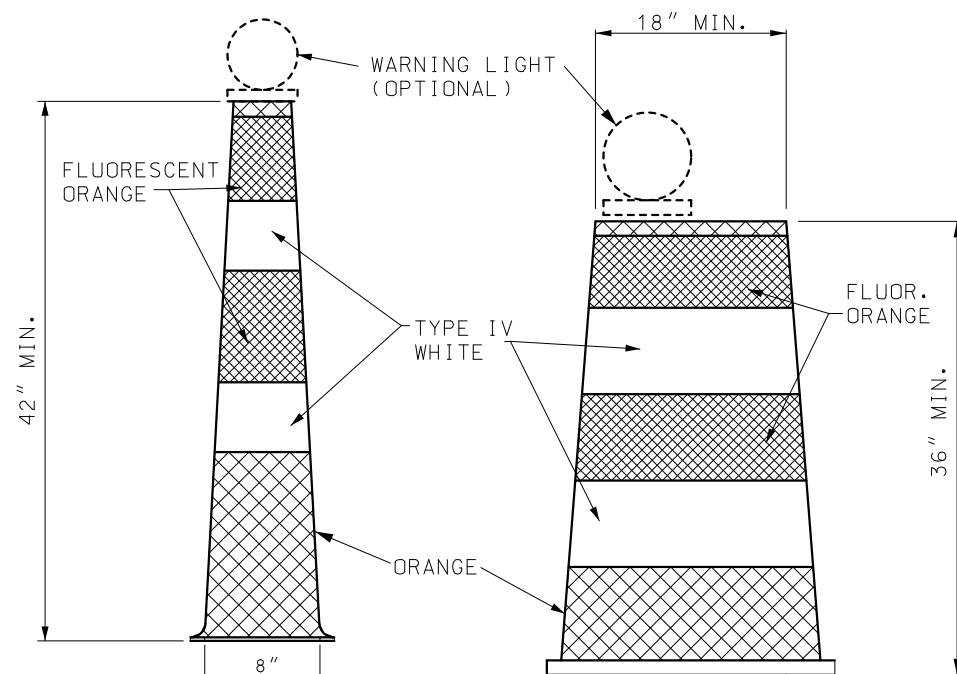


DIRECTION INDICATOR BARRICADE

VERTICAL DIMENSIONS DO NOT INCLUDE PROJECTIONS DESIGNED FOR EASE OF HANDLING.

DIRECTION INDICATOR BARRICADES SHALL NOT BE USED IN SHIFTING TAPERS UNLESS SHOWN ON THE PLANS.

THE PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.

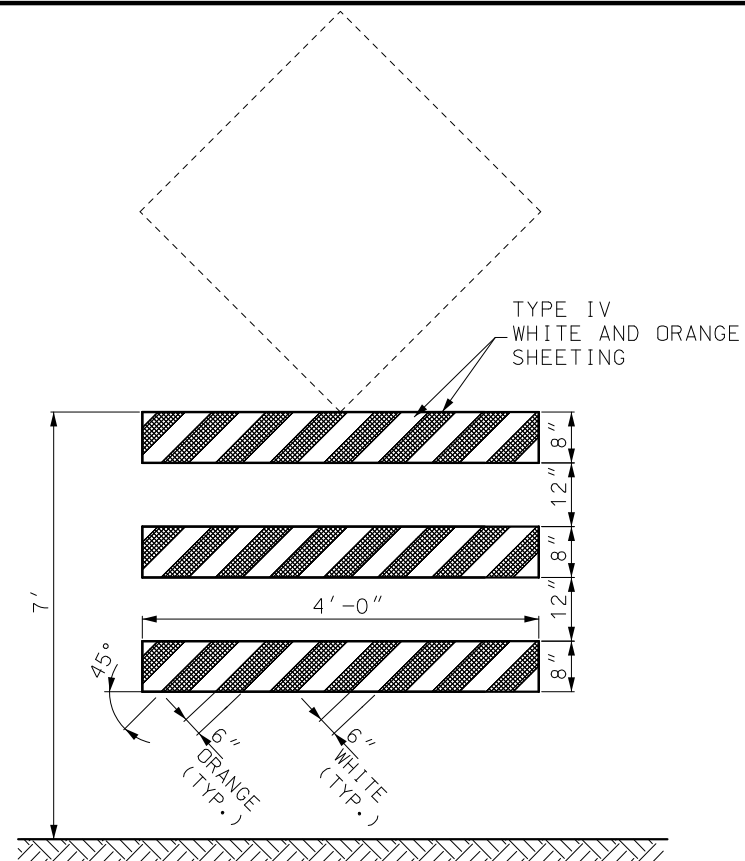


TRIM-LINE CHANNELIZERS

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.

DRUM-LIKE

STRIPES ON TRIM-LINE CHANNELIZERS SHALL BE 6" TO 8".
STRIPES ON DRUM-LIKE CHANNELIZERS SHALL BE 4" TO 6".



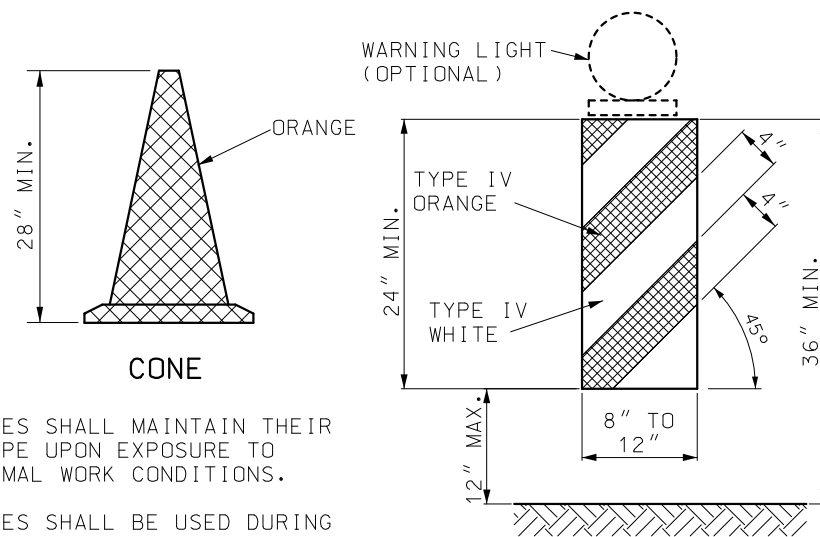
ADVANCE WARNING RAIL SYSTEM

MAXIMUM WEIGHT OF SIGN SHALL NOT EXCEED 25 LBS.

THE SIGN AND RAIL SYSTEM MAY BE MOUNTED AS TWO SEPARATE CRASHWORTHY DEVICES. THE RAIL SYSTEM SHALL BE LOCATED DIRECTLY IN FRONT OF THE SIGN WITH 7 TO 10 FEET SEPARATING THE TWO DEVICES.

WHERE MARKING IS NOT PROVIDED ON THE BACKSIDE, STRIPS OF 3" WIDE MODOT TYPE 7 ORANGE SHEETING MAY BE APPLIED TO THE ENDS OF EACH RAIL TO HELP DELINEATE THE DEVICE.

WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.4.



CONE

CONES SHALL MAINTAIN THEIR SHAPE UPON EXPOSURE TO NORMAL WORK CONDITIONS.

CONES SHALL BE USED DURING DAYLIGHT HOURS ONLY.

VERTICAL PANEL

VERTICAL PANELS SHALL BE SECURELY ATTACHED TO A SUPPORT THAT IS PORTABLE, CAPABLE OF REMAINING UPRIGHT AND ENTIRELY FREE STANDING.

GENERAL NOTES:

WHITE, ORANGE, AND FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.

BALLAST FOR TRAFFIC CONTROL DEVICES SHALL CONFORM TO MANUFACTURERS' RECOMMENDATION FOR FIELD CONDITIONS WHEN APPLICABLE.

IF USED, THE WARNING LIGHT UNIT AND BATTERY COMPARTMENT SHALL BE FURNISHED BY THE DEVICE MANUFACTURER OR OTHERWISE MEET THE MANUFACTURER'S RECOMMENDATIONS FOR DESIGN AND WILL BE REQUIRED ON ALL DEVICES IN THE SERIES.

WARNING LIGHTS SHALL BE IN ACCORDANCE WITH SEC 1063.5.



UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DRUM-LIKE CHANNELIZERS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONG-ITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA WHERE NO RAMPS, INTERSECTIONS OR LIMITED LATERAL CLEARANCE EXISTS.

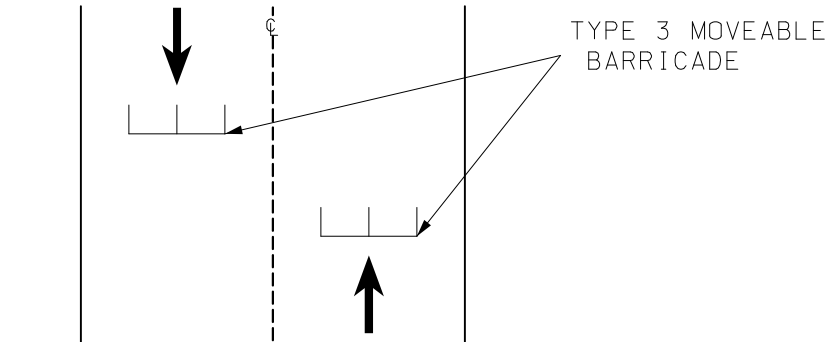
UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE DIRECTION INDICATOR BARRICADES IN LIEU OF TRIM-LINE CHANNELIZERS IN MERGING TAPERS.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE VERTICAL PANELS IN LIEU OF TRIM-LINE CHANNELIZERS TO PROVIDE LONGITUDINAL CHANNELIZATION WITHIN THE ACTIVITY AREA.

UPON APPROVAL OF THE ENGINEER, THE CONTRACTOR MAY, AT NO ADDITIONAL COST, USE CONES IN LIEU OF TRIM-LINE CHANNELIZERS DURING DAYTIME OPERATIONS ON MINOR ROUTES.

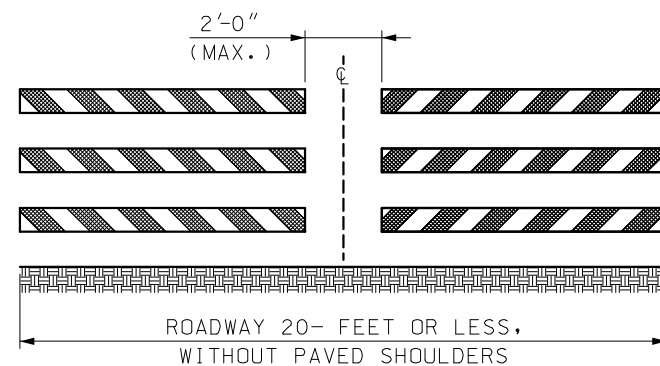
PANEL AND RAIL MARKINGS FOR TRAFFIC DELINEATION SHALL SLOPE DOWNWARD TOWARD THE INTENDED DIRECTION OF TRAVEL. ILLUSTRATIONS SHOWN ARE FOR INSTANCES WHERE TRAFFIC MOVES TO THE LEFT, REVERSE CONFIGURATIONS SHALL BE USED FOR TRAFFIC MOVEMENTS TO THE RIGHT. MARKINGS SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR PANEL, OR MAY BE APPLIED TO BOTH THE FRONT AND BACK PROVIDING THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.

| | | |
|--|---|----------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | TEMPORARY TRAFFIC CONTROL DEVICES CHANNELIZERS AND DIRECTION INDICATOR BARRICADE | |
| | DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 616.10AW |

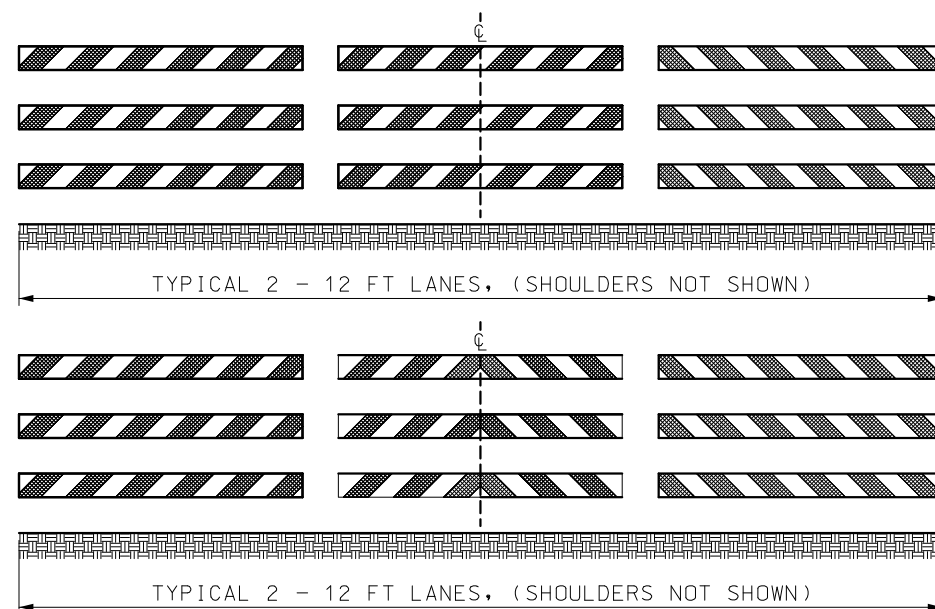


RETROREFLECTIVE MARKING ON TYPE 3 BARRICADES SHALL BE ON BOTH SIDES OF EACH RAIL AND DIRECT TRAFFIC MOVEMENT APPROPRIATELY TO ALLOW VEHICLES TO PASS THROUGH

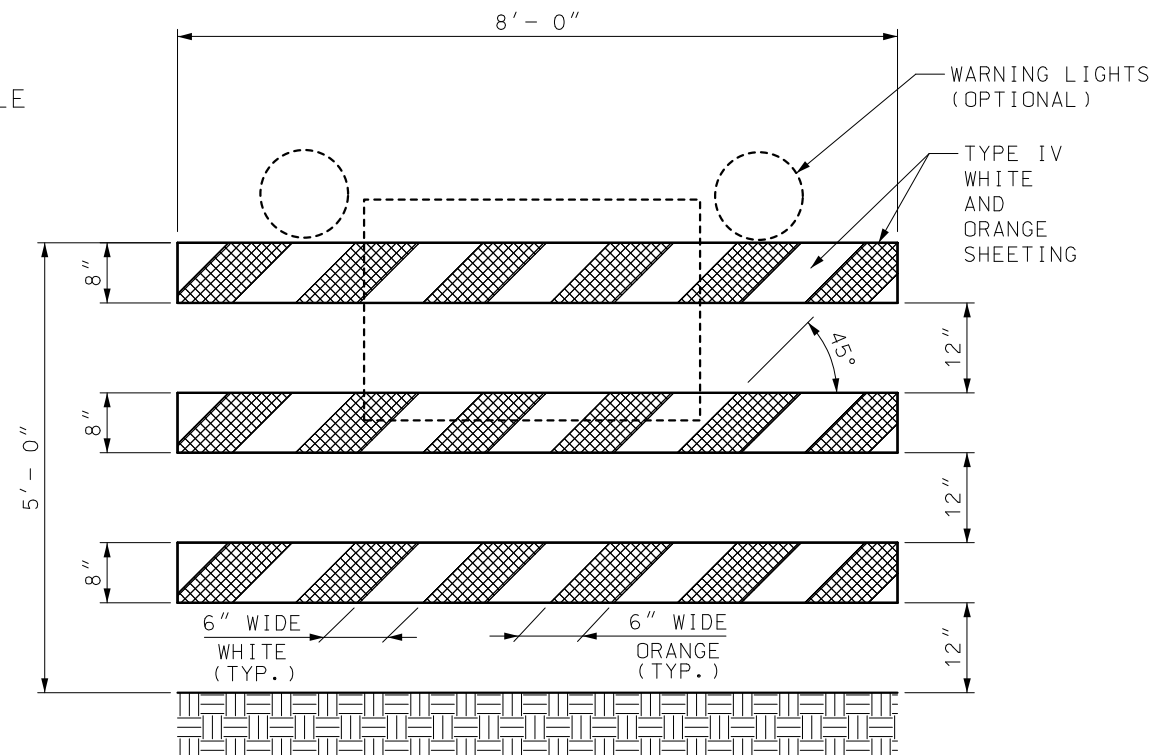
SOFT CLOSURE
PLAN VIEW



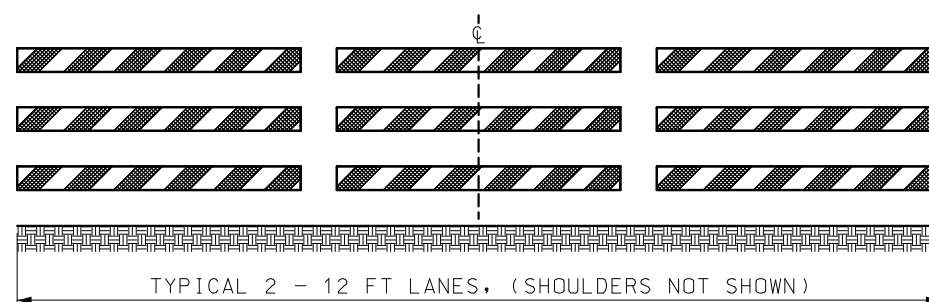
EXAMPLE 2



EXAMPLE 4

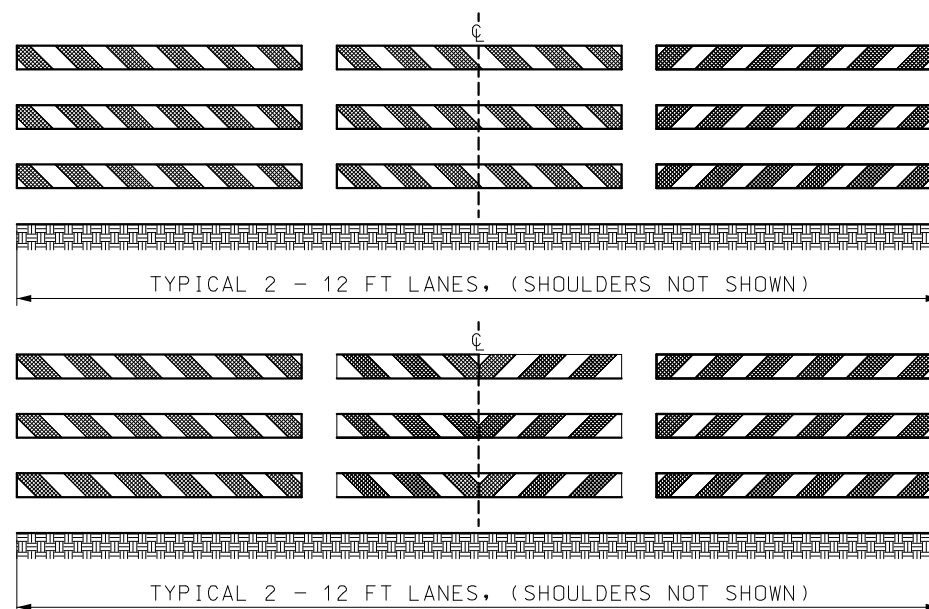


EXAMPLE 1



EXAMPLE SHOWS STRIPES SLOPING TO DIRECT
VEHICULAR MOVEMENT TOWARD THE LEFT

EXAMPLE 3



EXAMPLE 5

EXAMPLE 1 – ONE TYPE 3 MOVABLE BARRICADE WILL BE REQUIRED TO COMPLETELY CLOSE EACH 8' OF PAVEMENT. PAVED SHOULDERS SHALL BE INCLUDED IN THE AREA TO BE CLOSED.

SIGNS SHALL BE LIGHT WEIGHT (ROLL-UP OR PLASTIC) AND SHOULD NOT OBSCURE MORE THAN 50 PERCENT OF THE TOP 2 RAILS OR 33 PERCENT OF ALL THREE RAILS.

WARNING LIGHTS SHALL BE LIGHT WEIGHT (3.3 LBS. OR LESS) OR HAVE BATTERY PACK MOUNTED NO HIGHER THAN 18-INCH AND SHALL NOT COVER ANY PORTION OF THE BARRICADE FACE.

IF WARNING LIGHTS ARE USED, THE LIGHTS SHOULD BE INSTALLED ON THE BARRICADES IN THE DIRECTION OF TRAFFIC.

IF SIGNS OR LIGHTS CANNOT MEET THE ABOVE REQUIREMENTS, THEY SHALL BE MOUNTED ON SEPARATE CRASHWORTHY DEVICES AT HEIGHTS SPECIFIED FOR POST MOUNTED SIGNS, LOCATED IN TABLE A ON SHEET 1. THE BARRICADE SHALL BE LOCATED IN FRONT OF THE SIGNS OR LIGHTS WITH 7 TO 10 FEET SEPARATING THE DEVICES.

TYPE 3 MOVABLE BARRICADES SHALL BE ENTIRELY FREE STANDING AND PORTABLE. MARKING SHALL ONLY BE APPLIED TO THE FRONT OF EACH RAIL OR MAY BE APPLIED TO BOTH THE FRONT AND THE BACK OF EACH RAIL PROVIDED THE MARKING ON THE BACK DOES NOT CONFLICT WITH INTENDED OPPOSING TRAFFIC MOVEMENT.



WHITE AND ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 104.2.7.4.

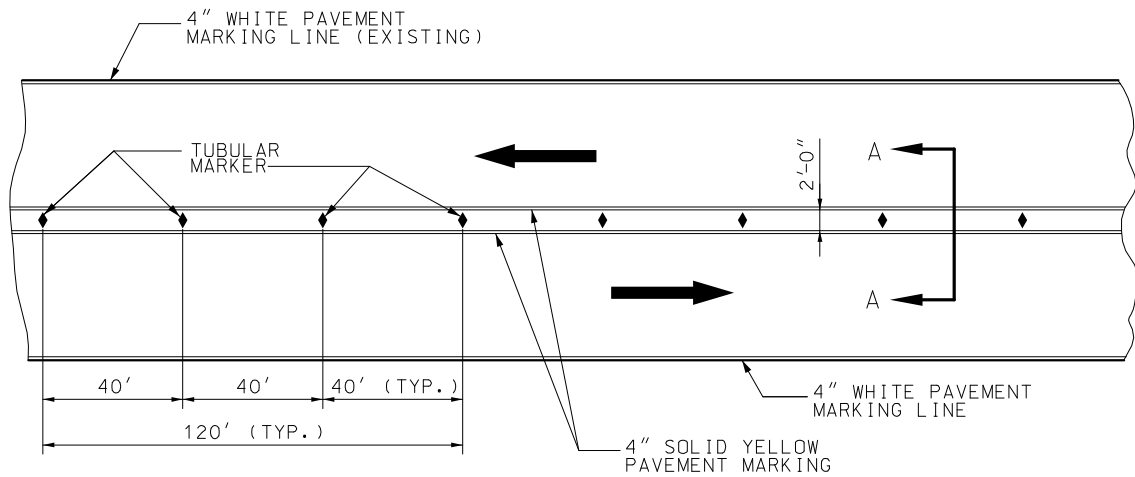
EXAMPLE 2 – FOR PAVED ROADWAYS WITH A WIDTH OF 20-FEET OR LESS AND WITHOUT PAVED SHOULDERS, TWO BARRICADES ARE ACCEPTABLE.

EXAMPLE 3 – WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

EXAMPLE 4 – WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, STRIPES SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES.

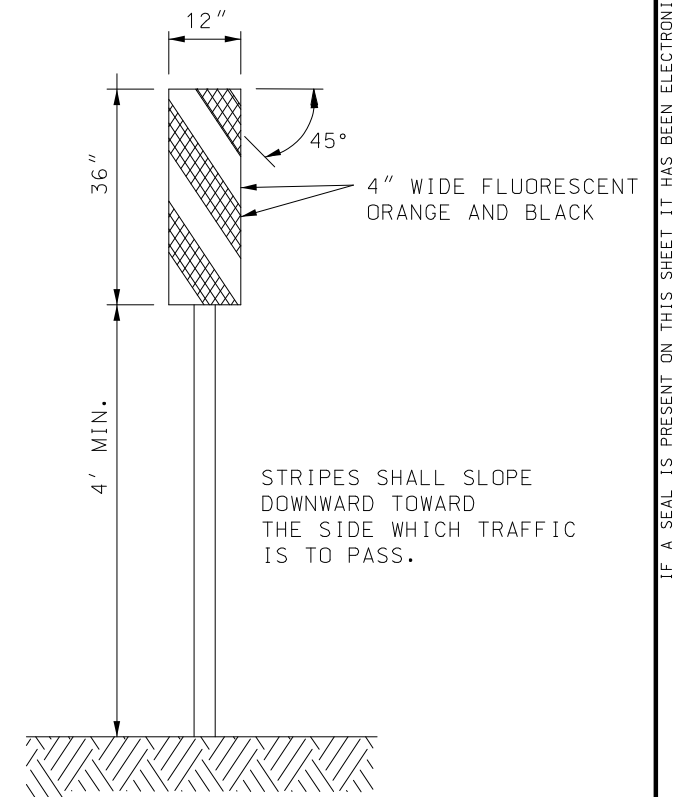
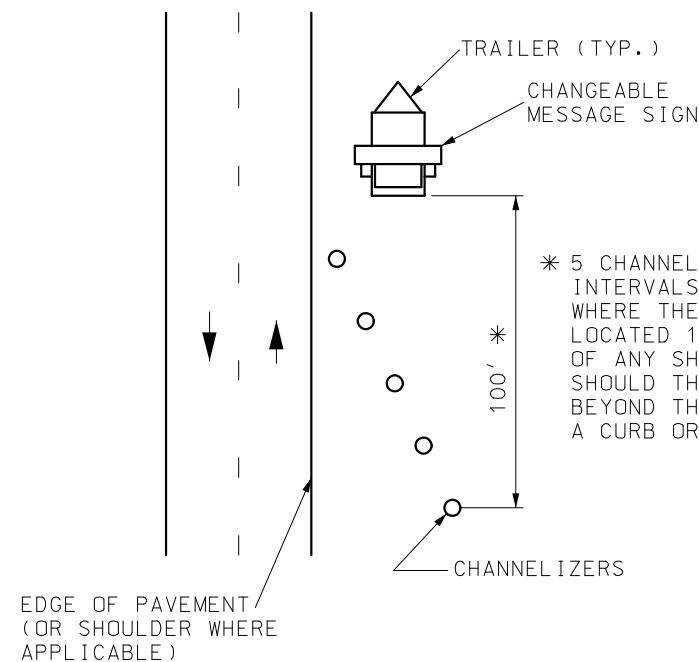
EXAMPLE 5 – WHERE NO TURNS ARE INTENDED, STRIPES POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.

| | | |
|--|---|----------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | TEMPORARY TRAFFIC CONTROL DEVICES TYPE 3 MOVABLE BARRICADE | |
| | DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 616.10AW |



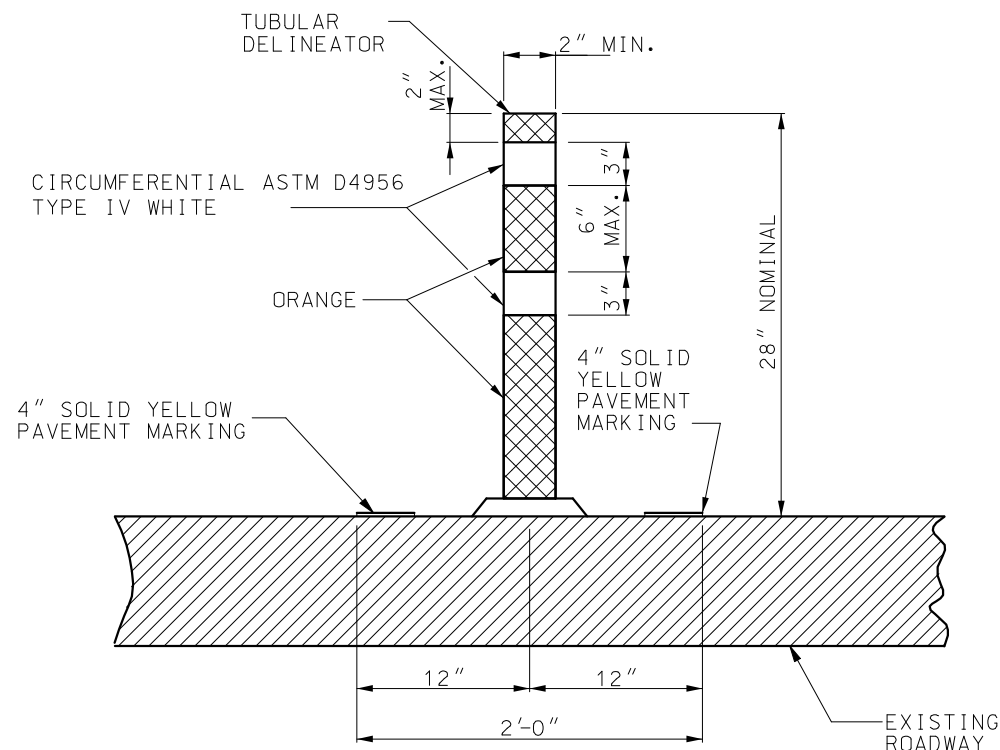
TWO LANE / TWO WAY TRAFFIC DELINEATION PLAN FOR DIVIDED HIGHWAY

IF RAISED PAVEMENT MARKERS ARE PRESENT, THE LENSES SHALL BE REMOVED OR COVERED TO THE SATISFACTION OF THE ENGINEER.



TYPE 3 OBJECT MARKERS

FLUORESCENT ORANGE REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.

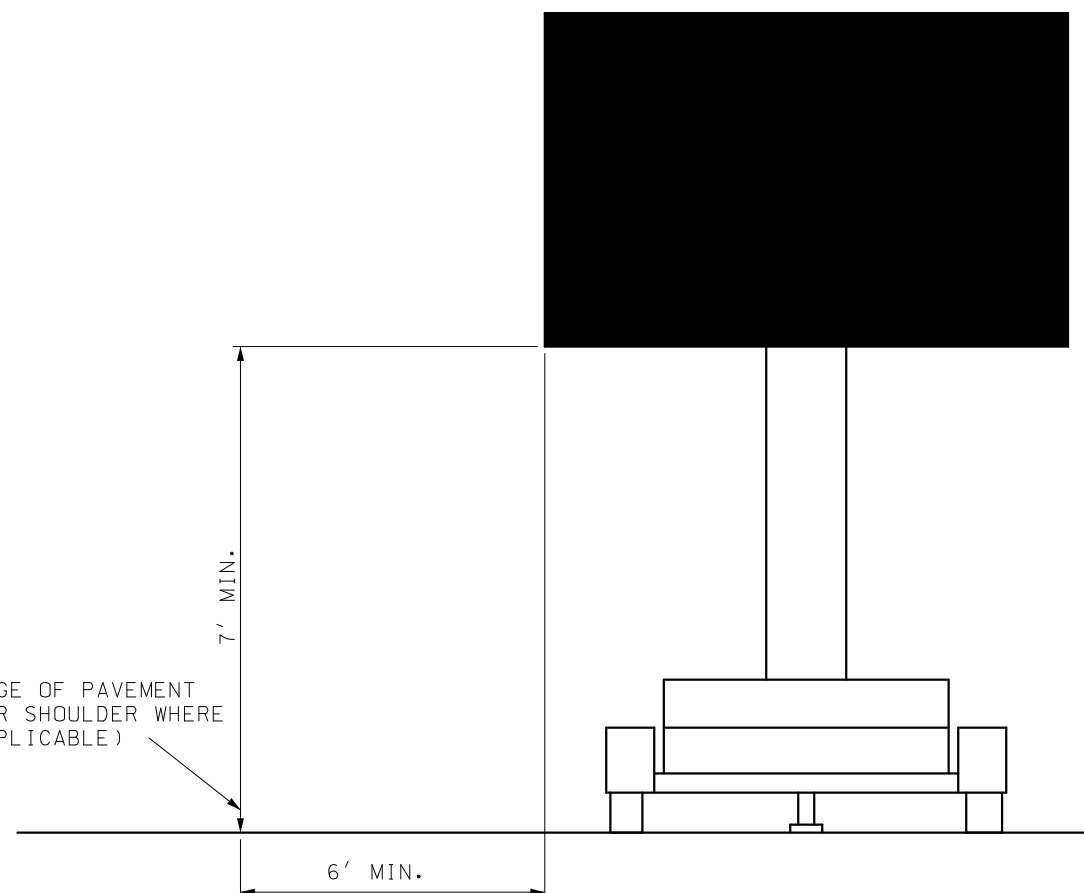


SECTION A-A TUBULAR DELINEATOR DETAIL

AN ADHESIVE, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, SHALL BE USED TO APPLY THE TUBULAR DELINEATOR TO THE ROADWAY SURFACE. THE ADHESIVE SHALL PERMIT EASY REMOVAL OF THE TUBULAR DELINEATOR WITHOUT DAMAGE TO THE ROADWAY SURFACE.

REFLECTIVE SHEETING APPLIED TO TUBULAR DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.

EDGE OF PAVEMENT (OR SHOULDER WHERE APPLICABLE)



| | |
|--|---|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | TEMPORARY TRAFFIC CONTROL DEVICES |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | SHEET NO. 616.10AW 5 OF 9 |

| WARNING SIGNS | | | | | | | |
|---------------|---------------|-------------------|--------------|----------------------|----------------|-------------|---|
| SIGN | SIZE (IN.) | AREA (SQ. FT.) | SHEETING | COLOR | | DESIGNATION | DESCRIPTION |
| | | | | SYM. LEG. BRD. | BACK GROUND | | |
| E05-2 | 48X36 | 12.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | EXIT OPEN (3) |
| E05-2a | 48X36 | 12.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | EXIT CLOSED |
| W01-1L | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TURN (SYMBOL LEFT ARROW) |
| W01-1R | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TURN (SYMBOL RIGHT ARROW) |
| W01-2L | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | CURVE (SYMBOL LEFT ARROW) |
| W01-2R | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | CURVE (SYMBOL RIGHT ARROW) |
| W01-3L | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | REVERSE TURN (SYMBOL LEFT ARROW) |
| W01-3R | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | REVERSE TURN (SYMBOL RIGHT ARROW) |
| W01-4L | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | REVERSE CURVE (SYMBOL LEFT ARROW) |
| W01-4R | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | REVERSE CURVE (SYMBOL RIGHT ARROW) |
| W01-4bL | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DOUBLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (2) |
| W01-4bR | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DOUBLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (2) |
| W01-4cL | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TRIPLE ARROW REVERSE CURVE (SYMBOL LEFT ARROWS) (2) |
| W01-4cR | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TRIPLE ARROW REVERSE CURVE (SYMBOL RIGHT ARROWS) (2) |
| W01-6 | 60X30 | 12.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | HORIZONTAL ARROW (SYMBOL) |
| W01-6a | 72X36 | 18.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE) (1) |
| W01-7 | 60X30 | 12.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | DOUBLE HEAD HORIZONTAL ARROW (SYMBOL) |
| W01-7a | 72X36 | 18.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DOUBLE HEAD HORIZONTAL ARROW (SYMBOL ON PERMANENT BARRICADE)(1) |
| W01-8 | 18X24 | 3.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | CHEVRON (SYMBOL) |
| W01-8a | 30X36 | 7.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | CHEVRON (SYMBOL FOR DIVIDED HIGHWAYS) |
| W03-1 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | STOP AHEAD (SYMBOL) |
| W03-2 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | YIELD AHEAD (SYMBOL) |
| W03-3 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SIGNAL AHEAD (SYMBOL) |
| W03-4 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | BE PREPARED TO STOP |
| W03-5 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SPEED LIMIT AHEAD |
| W04-1L | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | MERGE (SYMBOL FROM LEFT) |
| W04-1R | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | MERGE (SYMBOL FROM RIGHT) |
| W04-1a(L) | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | MERGE (ARROW SYMBOL) (3) |
| W04-1a(R) | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | MERGE (ARROW SYMBOL) (3) |
| W05-1 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | ROAD/BRIDGE/RAMP NARROWS (4) |
| W05-3 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | ONE LANE BRIDGE |
| W05-5 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | NARROW LANES (3) |
| W06-1 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DIVIDED HIGHWAY (SYMBOL) |
| W06-2 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DIVIDED HIGHWAY END (SYMBOL) |
| W06-3 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TWO WAY TRAFFIC (SYMBOL) |
| W07-3a | 30X24 | 5.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | NEXT XX MILES (PLAQUE) |
| W08-1 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | BUMP |
| W08-2 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DIP |
| W08-3 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | PAVEMENT ENDS |
| W08-4 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SOFT SHOULDER |
| W08-5 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SLIPPERY WHEN WET (SYMBOL) |
| W08-6 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TRUCK CROSSING WITH FLAGS |
| W08-6c | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | TRUCK ENTRANCE (3) |
| W08-7a | 36X36 | 9.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | FRESH OIL/LOOSE GRAVEL (3) |
| W08-9 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | LOW SHOULDER |
| W08-11 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | UNEVEN LANES |
| W08-12 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | NO CENTER LINE |
| W08-15 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | GROOVED PAVEMENT |
| W08-15p | 30X24 | 5.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | MOTORCYCLE (PLAQUE) |
| W08-17(L) | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SHOULDER DROP-OFF (SYMBOL LEFT) |
| W08-17(R) | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SHOULDER DROP OFF (SYMBOL RIGHT) (4) |
| W08-17p | 30X24 | 5.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SHOULDER DROP-OFF (PLAQUE) |
| W10-1 | 42 RND. | 9.62 | ASTM 9 OR 11 | BK | FL. YL | SHF | RAILROAD CROSSING |
| W012-1 | 24X24 | 4.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DOUBLE DOWN ARROW (SYMBOL) |
| W012-2 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | LOW CLEARANCE (SYMBOL) |
| W012-2x | 24X18 | 3.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | LOW CLEARANCE (PLAQUE) (3) |
| W012-2a | 84X24 | 14.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | OVERHEAD LOW CLEARANCE (FEET AND INCHES) (3) |
| SPECIAL | 120X60 | 50.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | LOW CLEARANCE XX FT XX IN XX MILES AHEAD (3) |
| SPECIAL | 120X60 | 50.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | WIDTH RESTRICTION XX FT XX IN XX MILES AHEAD (3) |
| W013-1 | 30X30 | 6.25 | ASTM 9 OR 11 | BK | FL. OR | SHF | ADVISORY SPEED (PLAQUE) |
| W016-2 | 30X24 | 5.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | XXX FEET (PLAQUE) |
| W016-3 | 30X24 | 5.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | X MILE (PLAQUE) |
| W020-1 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | ROAD/BRIDGE/RAMP WORK AHEAD (4) |
| W020-2 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DETOUR AHEAD |
| | | | | | | | |

(1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

(2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

(3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.

(4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.

(5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.

(6) SHF REFER TO STD. 903.02 SHEET 1 OF 8


GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.


SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.

NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.

ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER
PE-2001018754
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

TEMPORARY
TRAFFIC CONTROL DEVICES
WARNING SIGNS

DATE EFFECTIVE: 07/01/2020
DATE PREPARED: 4/29/2020

616.10AW

SHEET NO.
6 OF 9

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

WARNING SIGNS

| SIGN | SIZE (IN.) | AREA (SQ. FT.) | SHEETING | COLOR | | DESIGNATION | DESCRIPTION |
|---------|---------------|-------------------|--------------|----------------------|----------------|-------------|--|
| | | | | SYM. LEG. BRD. | BACK GROUND | | |
| W020-3 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | ROAD CLOSED AHEAD |
| W020-4 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | ONE LANE ROAD AHEAD |
| W020-5 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | RIGHT/CENTER/LEFT LANE CLOSED AHEAD (4) |
| W020-5a | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | 2 RIGHT/CENTER/LEFT LANES CLOSED AHEAD (4) |
| W020-6a | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | RIGHT/CENTER/LEFT LANE CLOSED (3)(4) |
| W020-7 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | FLAGGER (SYMBOL) WITH FLAGS |
| W021-5 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | SHOULDER WORK AHEAD (3) |
| W021-5a | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | RIGHT/LEFT SHOULDER CLOSED |
| W021-5b | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | RIGHT/LEFT SHOULDER CLOSED AHEAD |
| W022-1 | 48X48 | 16.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | BLASTING ZONE AHEAD |
| W022-2 | 42X36 | 10.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | TURN OFF 2-WAY RADIO AND PHONE |
| W022-3 | 42X36 | 10.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | END BLASTING ZONE |

GUIDE SIGNS

| | | | | | | | |
|----------|-------|-------|--------------|----|--------|-----|---|
| E05-1 | 36X48 | 12.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | GORE EXIT (3) |
| G020-1 | 60X24 | 10.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | ROAD WORK NEXT XX MILES |
| G020-2 | 48X24 | 8.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | END ROAD WORK |
| G020-4 | 36X18 | 4.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | PILOT CAR FOLLOW ME - REAR VEHICLE MOUNT SIGN |
| G020-4a | 42X30 | 8.75 | ASTM 9 OR 11 | BK | FL. OR | SHF | PILOT CAR IN USE WAIT & FOLLOW - STATE ROUTE SIGN |
| G020-4a | 18X12 | 1.50 | ASTM 9 OR 11 | BK | FL. OR | SHF | PILOT CAR IN USE WAIT & FOLLOW - NON-STATE ROUTE SIGN |
| G020-5aP | 36X24 | 6.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | WORK ZONE (PLAQUE) (3) (5) |
| G022-1 | 15X21 | 2.19 | ASTM 9 OR 11 | BK | FL. OR | SHF | WET PAINT (ARROW PIVOTS) (3) |
| M04-8a | 24X18 | 3.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | END DETOUR |
| M04-9L | 48X36 | 12.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DETOUR (LEFT ARROW) |
| M04-9R | 48X36 | 12.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DETOUR (RIGHT ARROW) |
| M04-9P | 48X12 | 4.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | STREET NAME (PLAQUE) |
| M04-10L | 48X18 | 6.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DETOUR (ARROW LEFT) |
| M04-10R | 48X18 | 6.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | DETOUR (ARROW RIGHT) |

REGULATORY SIGNS

| | | | | | | | |
|----------|---------|-------|--------|-------|---------------|----|---|
| R1-1 | 48X48 | 13.25 | ASTM 4 | WH | RD | SH | STOP |
| R1-2 | 48 TRI. | 6.93 | ASTM 4 | RD | WH | SH | YIELD |
| R1-2a | 36X36 | 9.00 | ASTM 4 | BK | WH | SH | TO ONCOMING TRAFFIC (PLAQUE) |
| R1-3p | 30X12 | 2.50 | ASTM 4 | WH | RD | SH | ALL WAY (PLAQUE) |
| R2-1 | 36X48 | 12.00 | ASTM 4 | BK | WH | SH | SPEED LIMIT XX |
| R3-1 | 48X48 | 16.00 | ASTM 4 | BK/RD | WH | SH | NO RIGHT TURN (SYMBOL) |
| R3-2 | 48X48 | 16.00 | ASTM 4 | BK/RD | WH | SH | NO LEFT TURN (SYMBOL) |
| R3-3 | 36X36 | 9.00 | ASTM 4 | BK | WH | SH | NO TURNS |
| R3-4 | 48X48 | 16.00 | ASTM 4 | BK/RD | WH | SH | NO U-TURN (SYMBOL) |
| R3-7L | 30X30 | 6.25 | ASTM 4 | BK | WH | SH | LEFT LANE MUST TURN LEFT |
| R3-7R | 30X30 | 6.25 | ASTM 4 | BK | WH | SH | RIGHT LANE MUST TURN RIGHT |
| R4-1 | 36X48 | 12.00 | ASTM 4 | BK | WH | SH | DO NOT PASS |
| R4-2 | 36X48 | 12.00 | ASTM 4 | BK | WH | SH | PASS WITH CARE |
| R4-7a | 36X48 | 12.00 | ASTM 4 | BK | WH | SH | KEEP RIGHT (HORIZONTAL ARROW) |
| R4-8a | 36X48 | 12.00 | ASTM 4 | BK | WH | SH | KEEP LEFT (HORIZONTAL ARROW) |
| R5-1 | 30X30 | 6.25 | ASTM 4 | RD | WH | SH | DO NOT ENTER |
| R5-1a | 36X24 | 6.00 | ASTM 4 | WH | RD | SH | WRONG WAY |
| R6-1L | 54X18 | 6.75 | ASTM 4 | BK | WH | SH | ONE WAY ARROW (LEFT) |
| R6-1R | 54X18 | 6.75 | ASTM 4 | BK | WH | SH | ONE WAY ARROW (RIGHT) |
| R6-2L | 24X30 | 5.00 | ASTM 4 | BK | WH | SH | ONE WAY (LEFT) |
| R6-2R | 24X30 | 5.00 | ASTM 4 | BK | WH | SH | ONE WAY (RIGHT) |
| R10-6 | 24X36 | 6.00 | ASTM 4 | BK | WH | SH | STOP HERE ON RED (45° ARROW) |
| R11-2 | 48X30 | 10.00 | ASTM 4 | BK | WH | SH | ROAD CLOSED |
| R11-3a | 60X30 | 12.50 | ASTM 4 | BK | WH | SH | ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY |
| R11-4 | 60X30 | 12.50 | ASTM 4 | BK | WH | SH | ROAD CLOSED TO THRU TRAFFIC |
| CONST-3A | 60X48 | 20.00 | ASTM 4 | BK | WH/ FL. OR | SH | FINE SIGN (3) |
| CONST-3X | 56X12 | 4.67 | ASTM 4 | BK | WH | SH | SPEEDING/PASSING (PLATE) (3) |

SPECIAL SIGNS

| | | | | | | | |
|---------|-------|-------|--------------|-------|-----------|-----|-------------------------|
| CONST-7 | 72X36 | 18.00 | ASTM 4 | WH/BL | BK/FL. OR | SH | RATE OUR WORK ZONE |
| CONST-7 | 48X24 | 8.00 | ASTM 4 | WH/BL | BK/FL. OR | SH | RATE OUR WORK ZONE |
| CONST-8 | 48X36 | 12.00 | ASTM 9 OR 11 | BK | FL. OR | SHF | WORK ZONE NO PHONE ZONE |

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.
- (6) SH REFER TO STD. 903.02 SHEET 1 OF 8
- (7) SHF REFER TO STD. 903.02 SHEET 1 OF 8


GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA, UNLESS SPECIFIED OTHERWISE.

SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.


NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.

ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



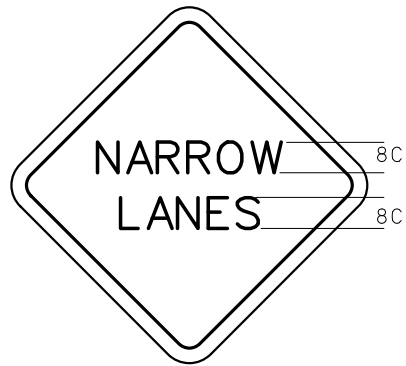
TEMPORARY TRAFFIC CONTROL DEVICES
WARNING, GUIDE AND REGULATORY SIGNS

DATE EFFECTIVE: 07/01/2020
DATE PREPARED: 4/29/2020

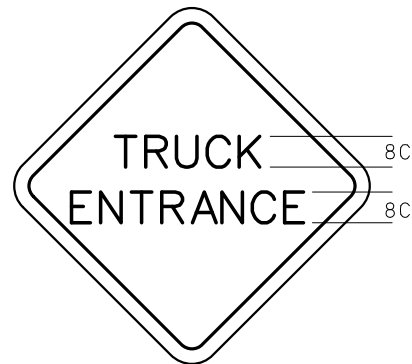
616.10AW

SHEET NO.
7 OF 9

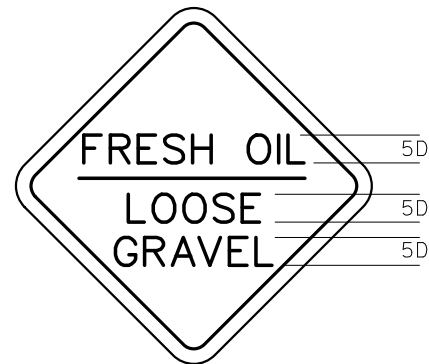
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



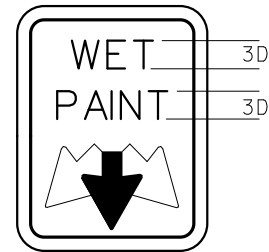
W05-5 (3)



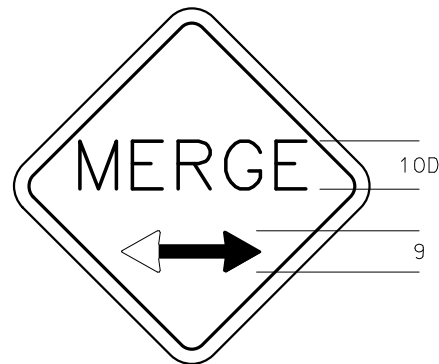
W08-6c (3)



W08-7a (3)



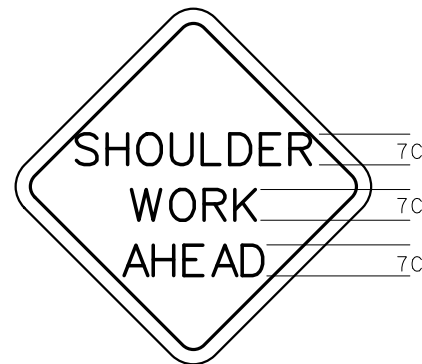
G022-1 (3)



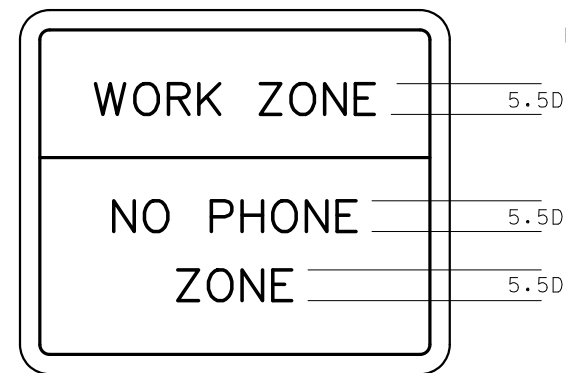
W04-1a



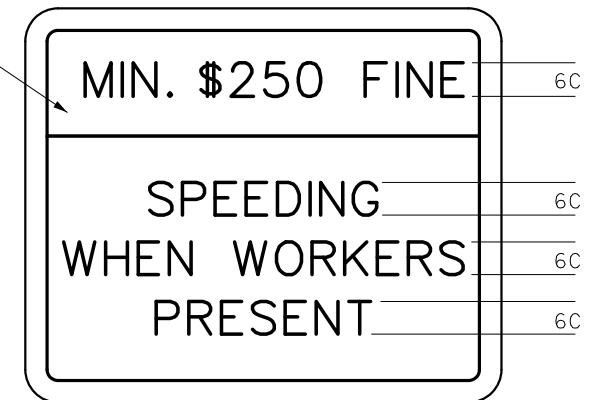
W020-6a (3)(4)



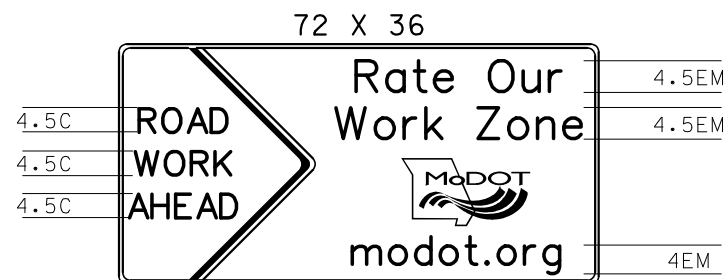
W021-5 (3)



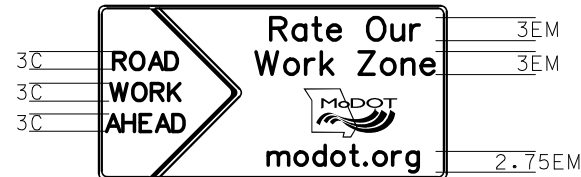
CONST-8 (3)



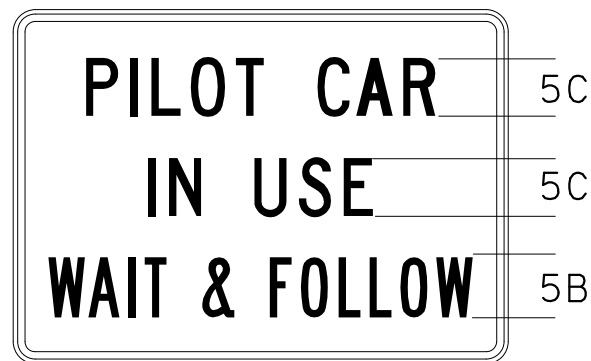
CONST-3A (3)



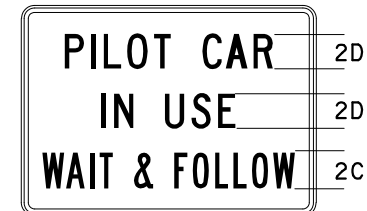
48 X 24



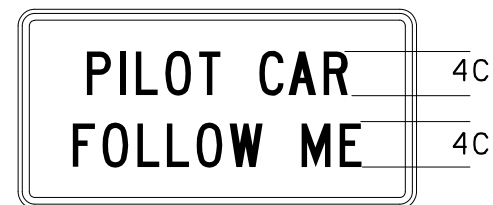
CONST-7



G020-4a (3)
42X30



G020-4a (3)(4)
18X12



G020-4 (3)
36X18



CONST-3X (3)



W012-5 (3)



W012-4 (3)

- (1) SIGN DEPICTION, ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (2) REFER TO THE LATEST EDITION OF MUTCD PART VI BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA FOR SIGN DEPICTION. ARROW, BORDERS AND SPACING SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (3) ARROW, BORDERS AND SPACING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA.
- (4) USE OF A SUPPLEMENTAL PLATE FOR LINE 1 IS ACCEPTABLE.
- (5) PLAQUE AND APPLICABLE REGULATORY SIGN MAY BE MANUFACTURED AS ONE SIGN.

GENERAL NOTES:

SIGN LAYOUTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" BY THE U.S. DEPARTMENT OF TRANSPORTATION - FHWA UNLESS SPECIFIED OTHERWISE.

SIGN DIMENSIONS SHOWN ARE MINIMUM. NO ADDITIONAL PAYMENT WILL BE MADE IF CONTRACTORS USE LARGER SIGNS.

NO ADDITIONAL PAYMENT WILL BE MADE FOR PLATES.

ALL PLAQUES SHALL HAVE A BORDER. PLATES SHALL NOT HAVE A BORDER.

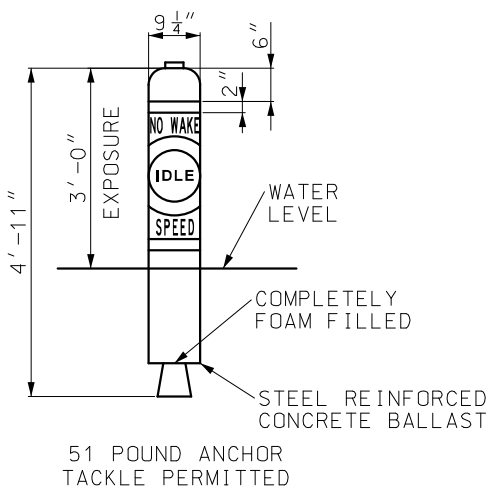
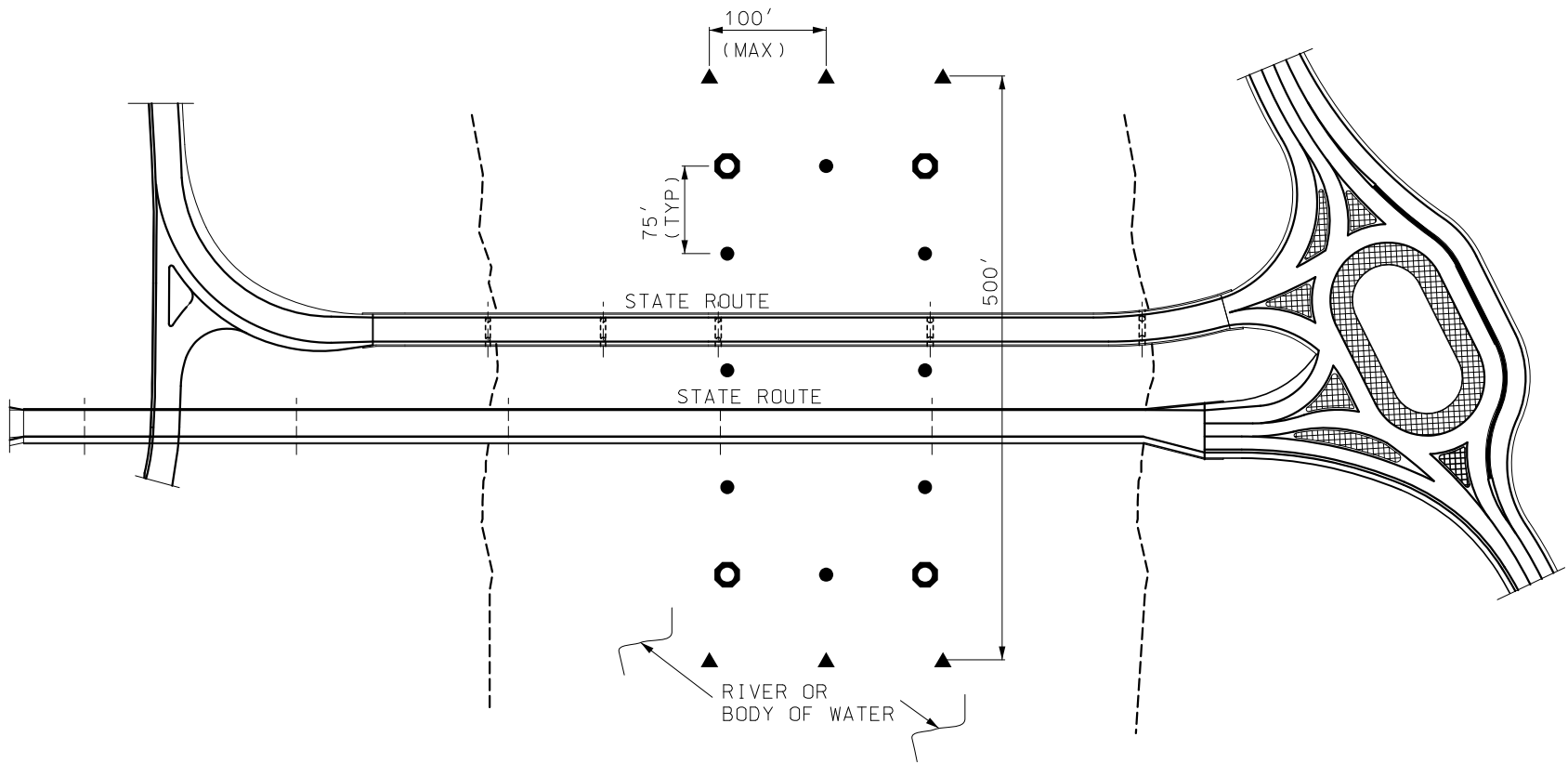
LETTER DIMENSIONS SHALL BE AS SHOWN.

| | | |
|--|--|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | TEMPORARY TRAFFIC CONTROL DEVICES | |
| DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 616.10AW | SHEET NO. 8 OF 9 |

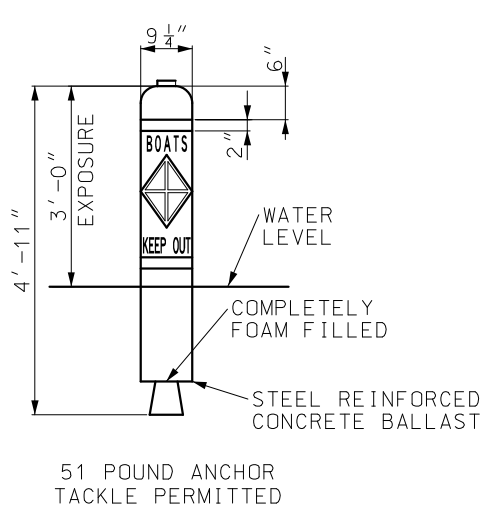
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

LEGEND

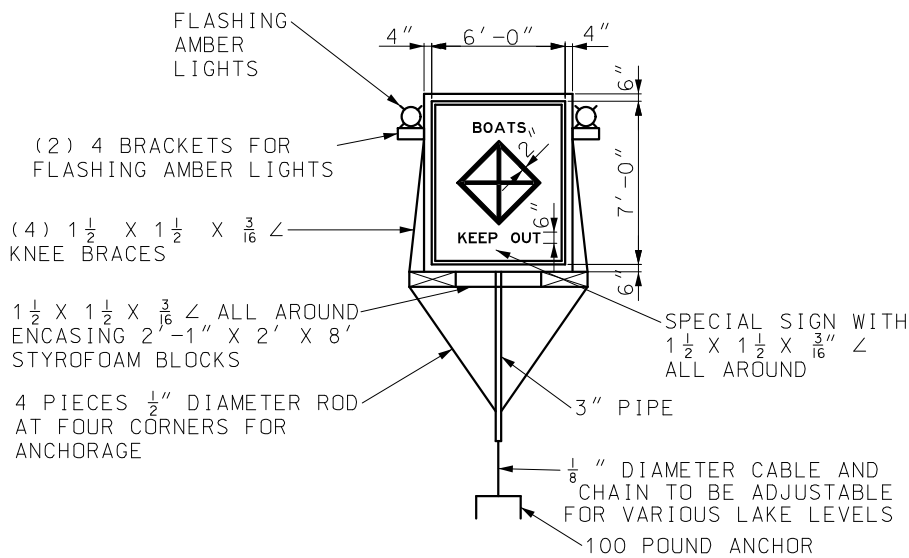
- - BOATS KEEP OUT (SIGN)
- - BOATS KEEP OUT (BUOY)
- ▲ - NO WAKE (BUOY)



RESTRICTED AREA BUOY
("NO WAKE")
(6 REQUIRED - ROADWAY ITEM)



CONTROLLED AREA BUOY
("BOATS KEEP OUT")
(8 REQUIRED - ROADWAY ITEM)



SPECIAL SIGN ASSEMBLY
("BOATS KEEP OUT")
(4 REQUIRED - ROADWAY ITEM)

GENERAL NOTES:

INFORMATION SHOWN IS SCHEMATIC ONLY. FINAL LOCATION AND NUMBER OF SIGNS AND BUOYS IS SUBJECT TO APPROVAL OF MISSOURI STATE WATER PATROL

THE DETAILS SHOWN ARE FOR BIDDING PURPOSES ONLY. ALL MATERIALS AND LABOR NECESSARY TO INSTALL AND REMOVE

SIGNS SHALL BE INCIDENTAL TO OTHER ITEMS

THE CONTRACTOR IS RESPONSIBLE FOR BUOY MAINTENANCE THROUGHOUT CONSTRUCTION AND FOR DETERMINING ANTICIPATED WATER LEVELS DURING CONSTRUCTION. EACH SIGN AND BUOY SHALL BE ANCHORED TO BOTTOM OF LAKE.

SIGNS SHALL BE DOUBLE FACED


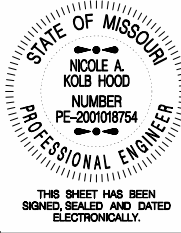
EACH SIGN SHALL BE EQUIPPED WITH TWO (2) FLASHING LIGHT UNITS WITH AMBER LENS. FLASHING LIGHT UNITS SHALL BE FURNISHED AND MAINTAINED BY THE CONTRACTOR

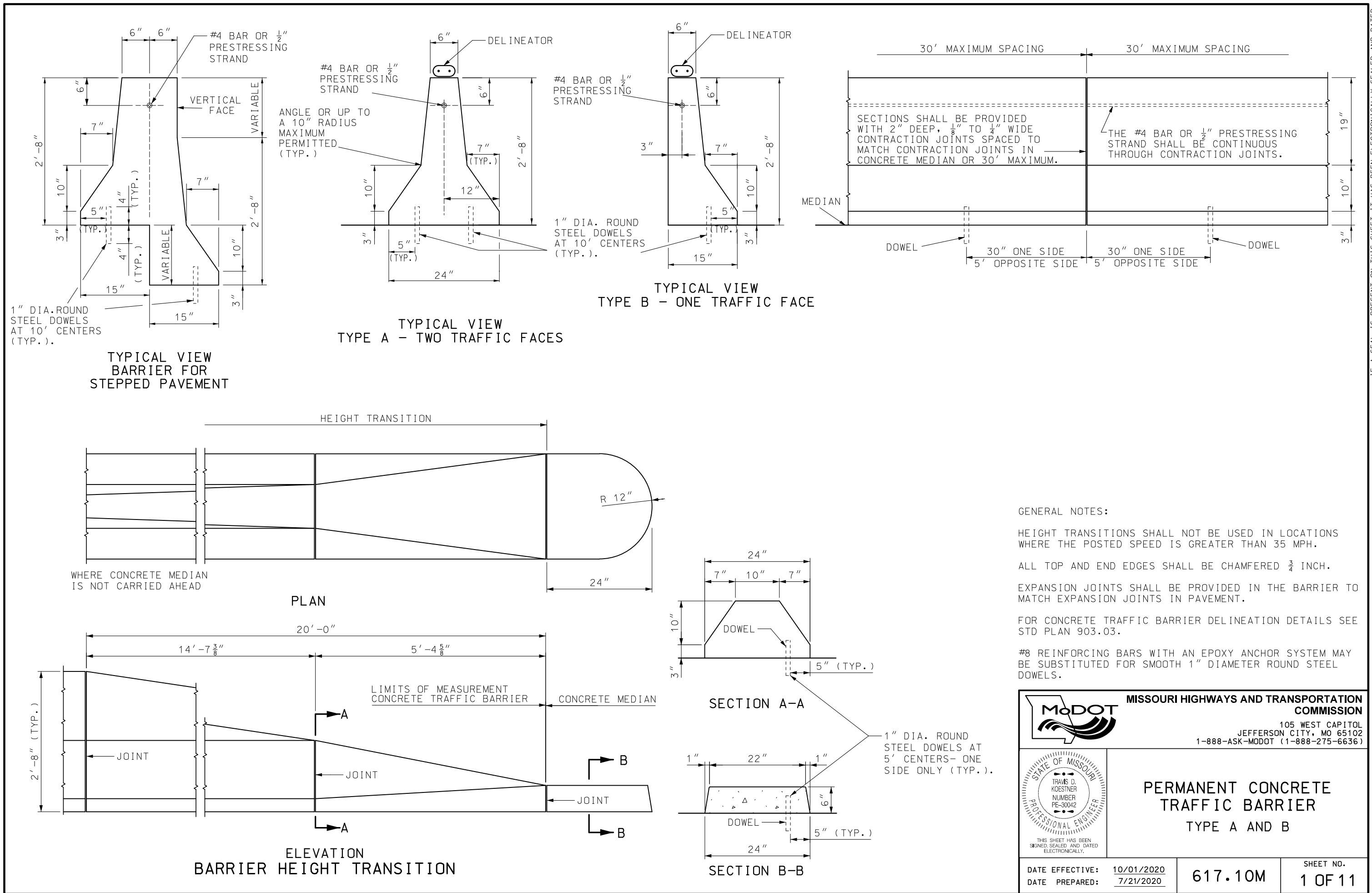
ALL LETTERING TO BE BLACK IN COLOR IN BLOCK FORM.

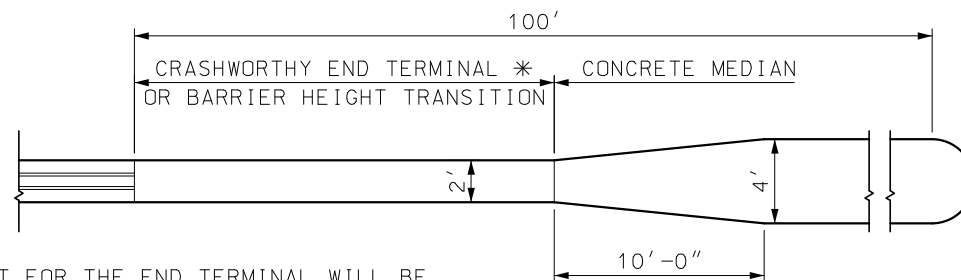
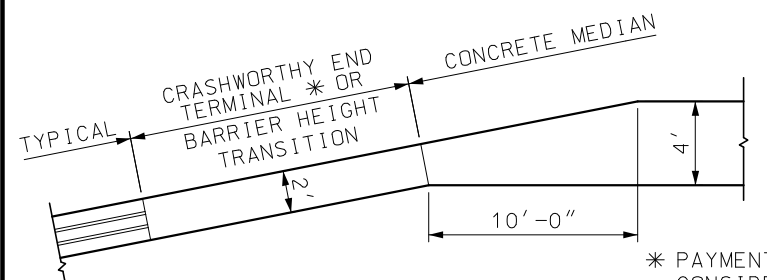
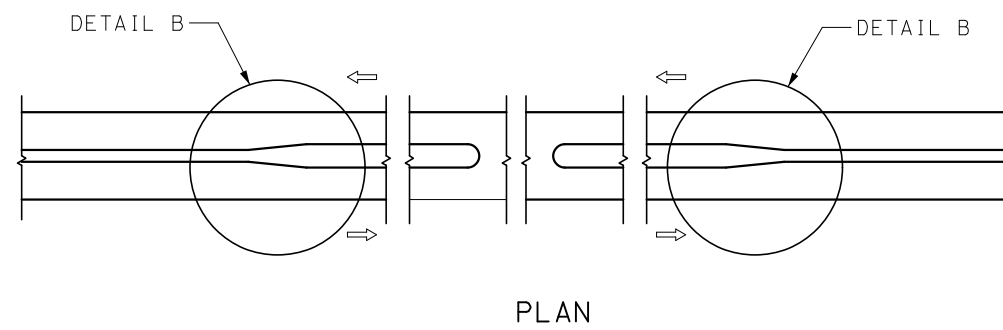
FOR OTHER INFORMATION AND LOCATION OF SIGNS AND BUOYS SEE SPECIAL PROVISIONS.

SCHEMATIC SHOWN IS FOR ONE NAVIGATIONAL SPAN. FOR WORK ON OTHER SPANS MOVE APPROPRIATE SIGNS WITH NO DIRECT PAY

COLOR:
BACKGROUND - WHITE
LEGEND - BLACK
2" REFLECTIVE BAND AND SYMBOL - INTERNATIONAL ORANGE

| | | |
|---|--|----------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | TEMPORARY TRAFFIC CONTROL DEVICES TRAFFIC CONTROL FOR WATERWAYS | |
| | DATE EFFECTIVE: 07/01/2020 DATE PREPARED: 4/29/2020 | 616.10AW |



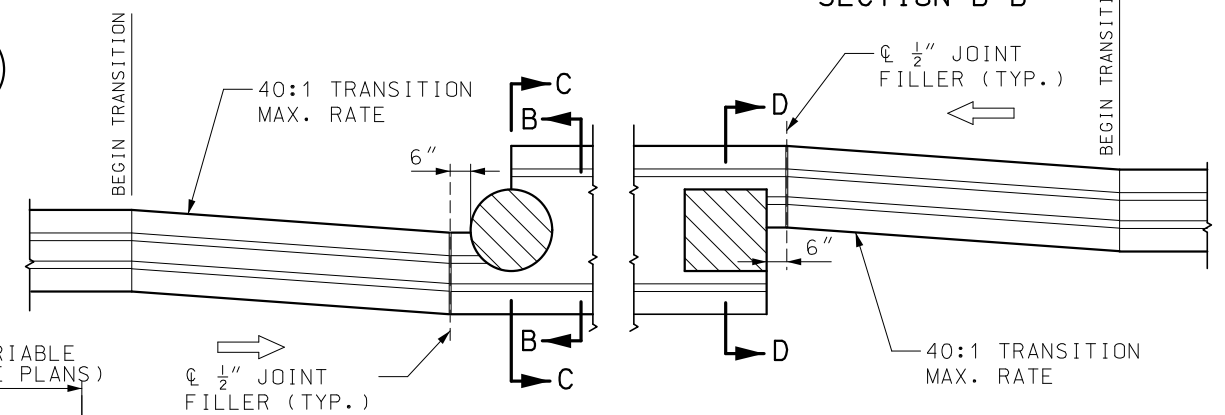


* PAYMENT FOR THE END TERMINAL WILL BE CONSIDERED FULL COMPENSATION FOR END TERMINAL, BACKUP ASSEMBLIES, AND OTHER ITEMS NECESSARY FOR PROPER INSTALLATION AS REQUIRED BY THE MANUFACTURER.

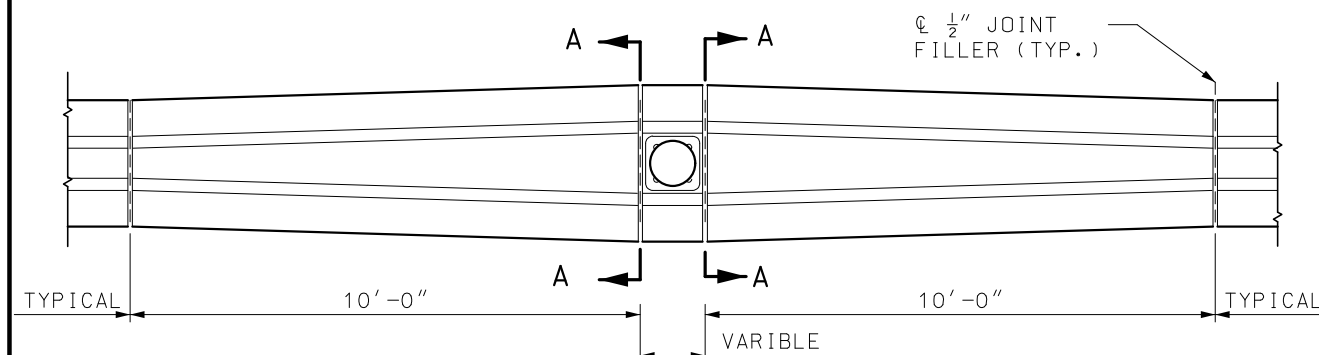
DETAIL A

LEFT TURN LANE TRANSITION

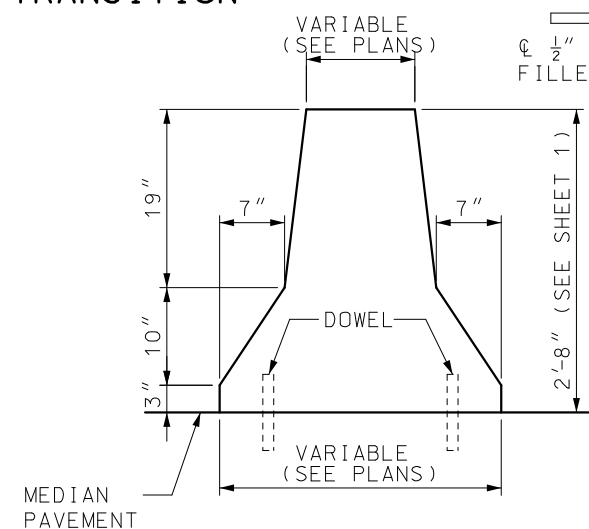
DETAIL B
MEDIAN OPENING TRANSITION



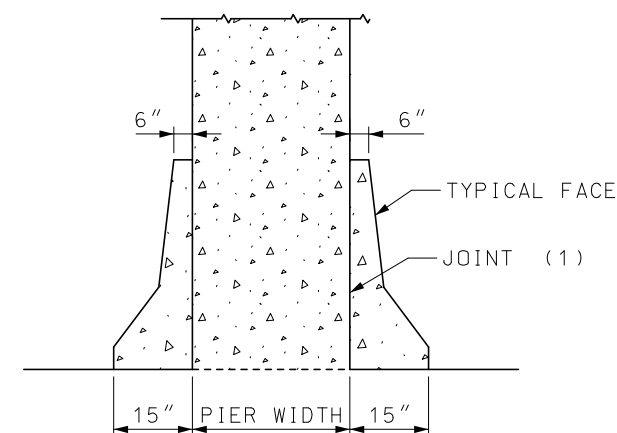
PLAN
TRANSITION DETAILS FOR
PIER PROTECTION



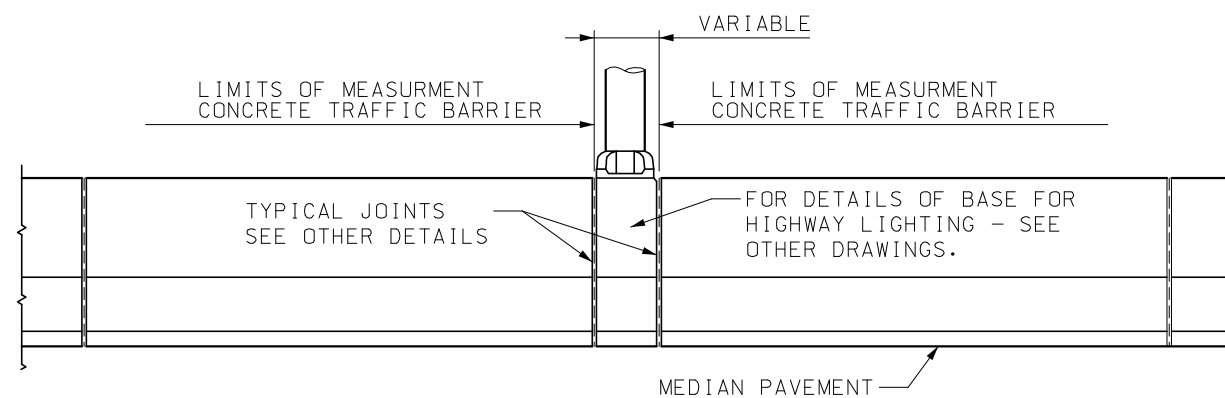
PLAN



SECTION A-A



SECTION D-D



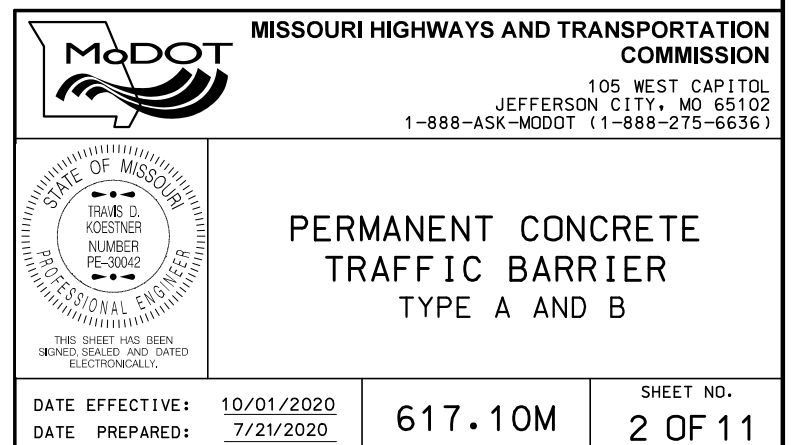
ELEVATION
TRANSITION DETAILS FOR MEDIAN LIGHTING

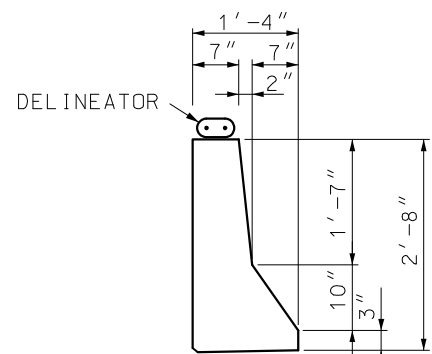
(1) 1 IN. JOINT WITH JOINT FILLER AND SEALER

GENERAL NOTES:

FOR DETAILS AND LOCATION OF DOWELS, SEE SHEET 1.

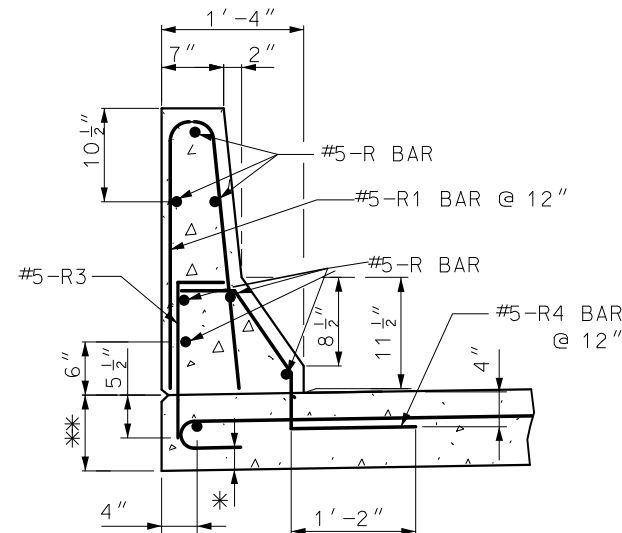
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.



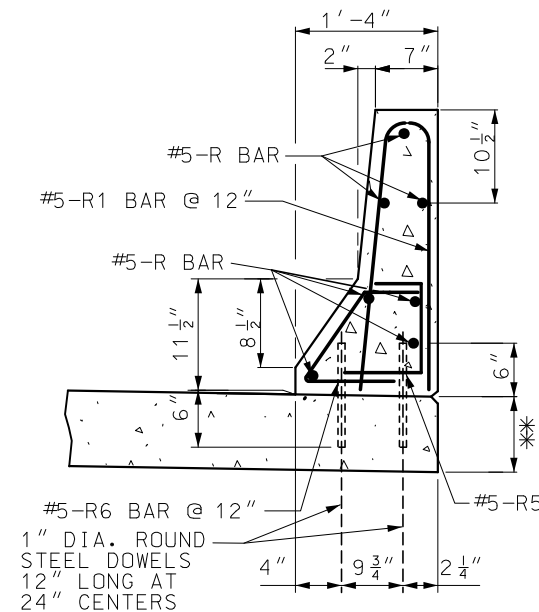


TYPE B (MODIFIED)
TYPICAL SECTION

| TABLE A TRANSVERSE PAVEMENT REINFORCEMENT | |
|---|--------------------------|
| PAVEMENT THICKNESS ** | BAR SIZE & SPACING |
| 8" | #5 @ 5" * |
| 9" | #5 @ 6" * |
| 10" | #5 @ 8" |
| 11" | #5 @ 9" |
| ≥ 12" | #6 @ 12" |



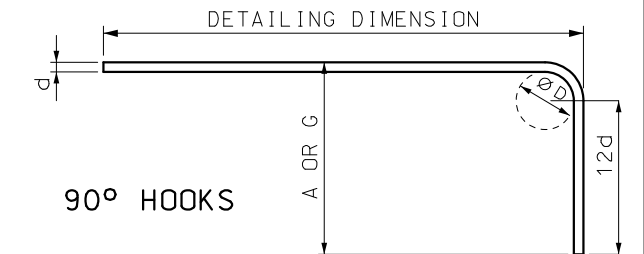
PART SECTION THROUGH
UPPER BARRIER



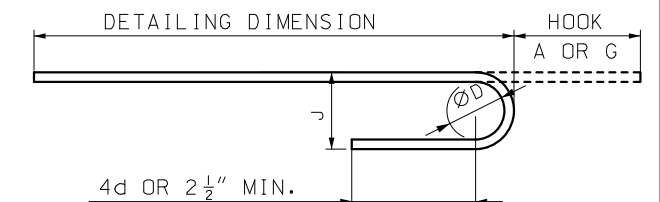
PART SECTION THROUGH
LOWER BARRIER

| END HOOK DIMENSIONS | | | | |
|---------------------|------------|------------|----|-----------|
| BAR SIZE | D (IN.) | ALL GRADES | | |
| | | 180° HOOKS | J | 90° HOOKS |
| #5 | 3 3/4" | 7" | 5" | 10" |
| #6 | 4 1/2" | 8" | 6" | 12" |

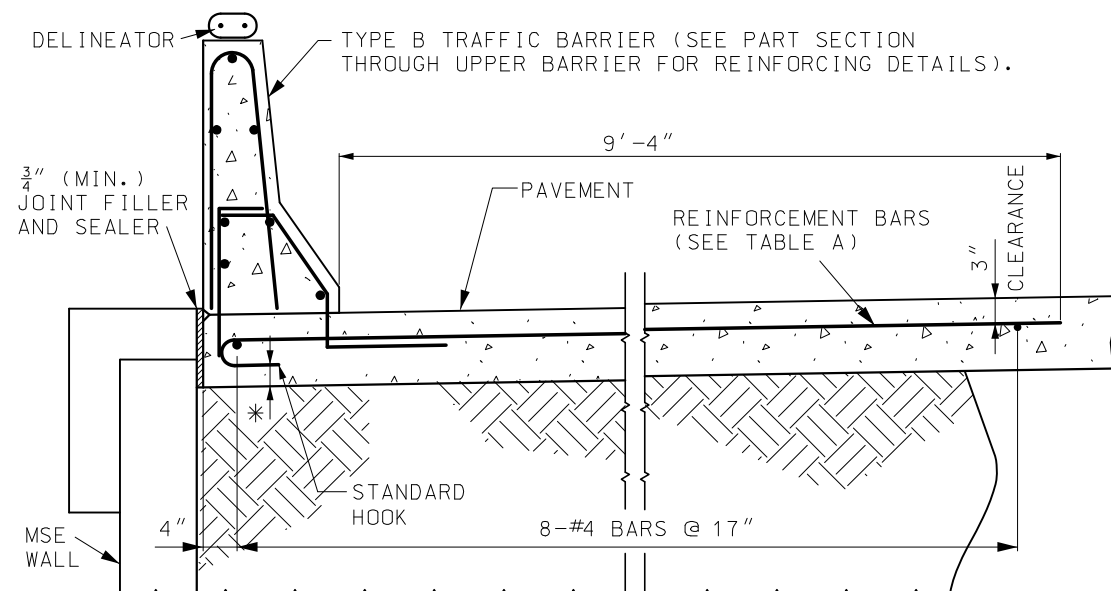
ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.



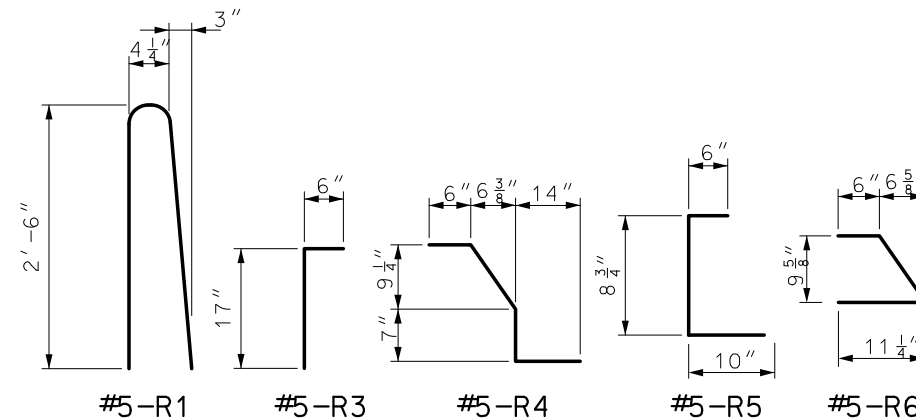
90° HOOKS



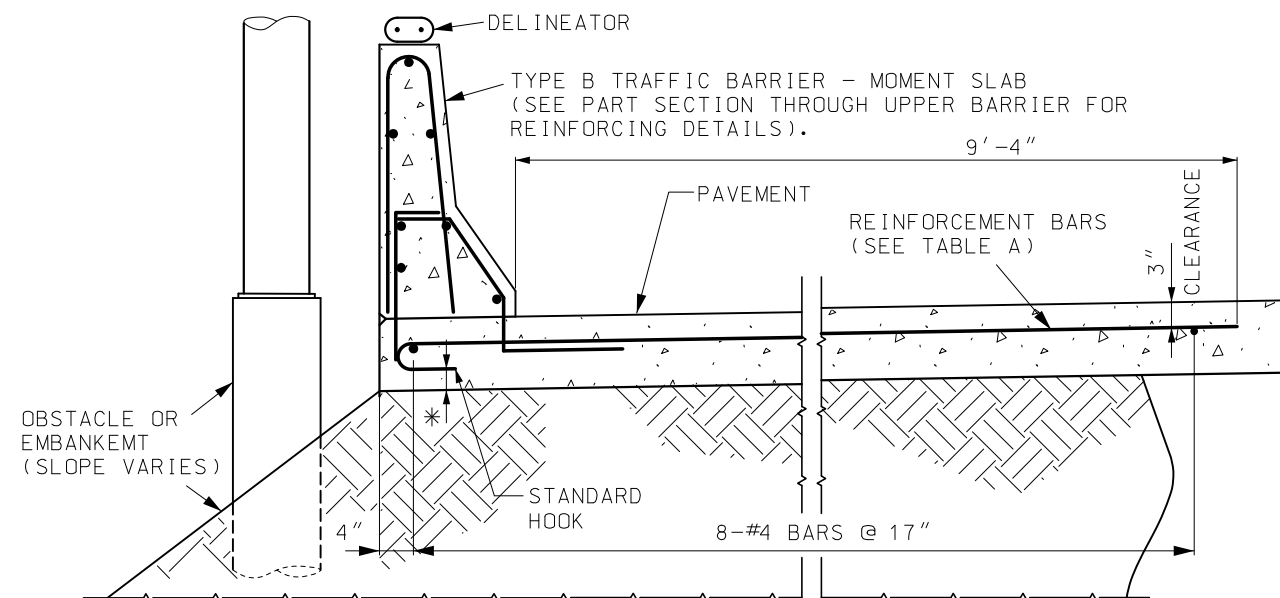
180° HOOKS



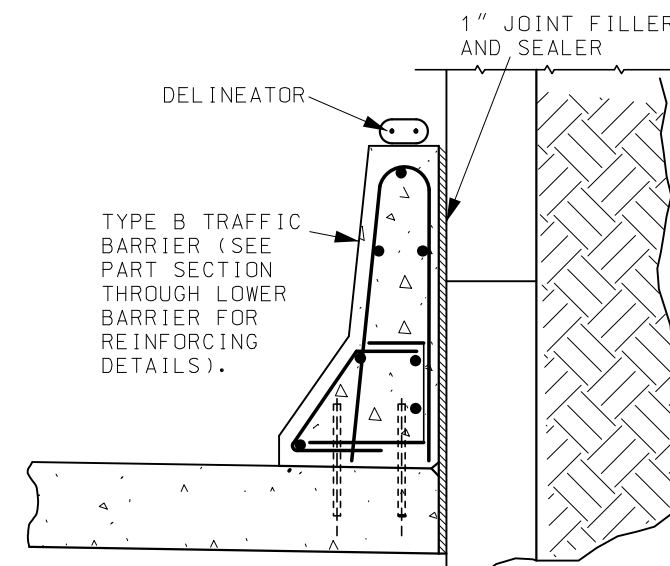
TYPE B TRAFFIC BARRIER ON TOP OF MSE WALL



#5-R1 #5-R3 #5-R4 #5-R5 #5-R6



TYPE B TRAFFIC BARRIER - MOMENT SLAB**



TYPE B TRAFFIC BARRIER AT THE
SIDE OF MSE WALL

NOTES:

- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.

TYPE B (MODIFIED) SHALL BE USED ONLY AT LOCATIONS SHOWN IN PLANS.

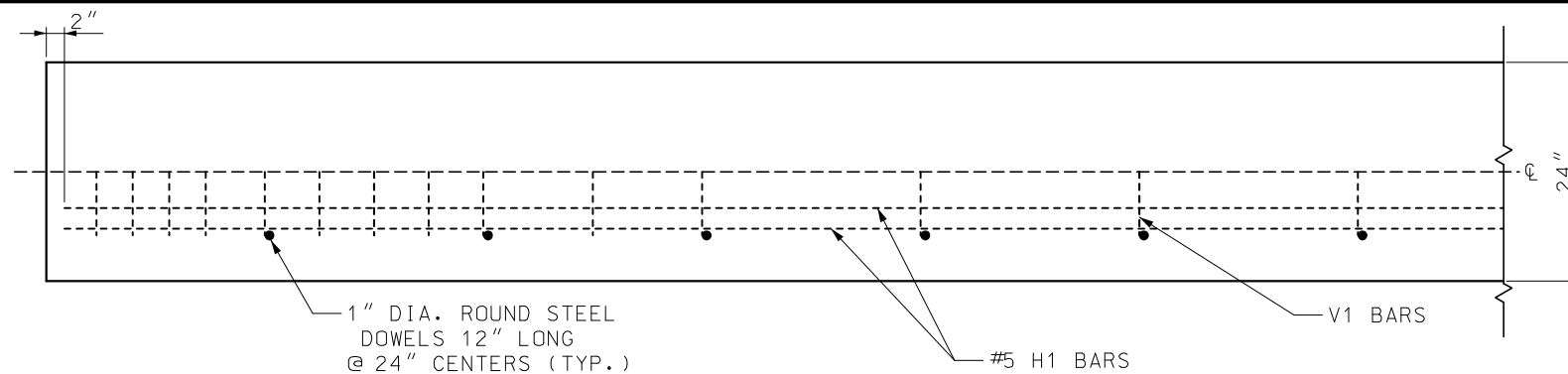
FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 1/2" MINIMUM CLEARANCE.

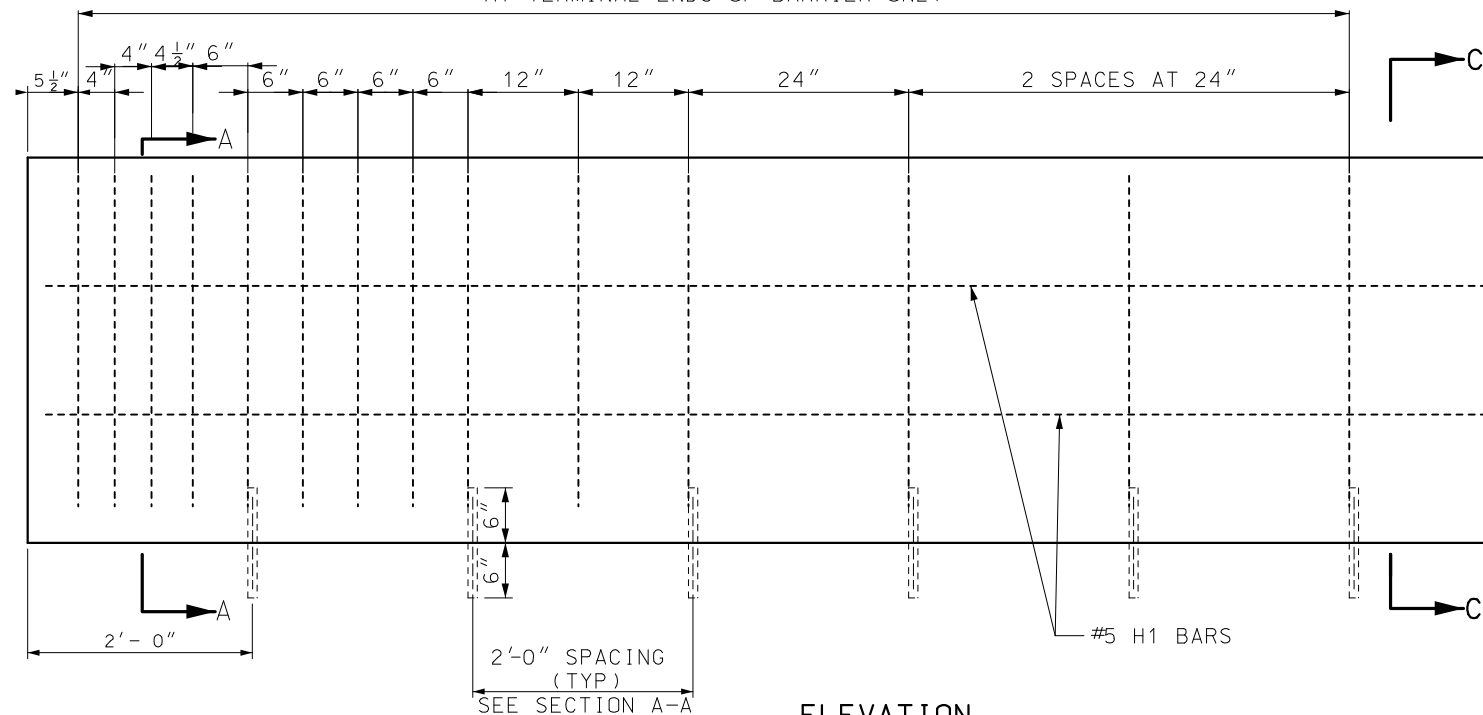
** SEE ROADWAY PAVEMENT DESIGN.

| | | | |
|--|--|--|---------------------------------|
| | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| PERMANENT CONCRETE TRAFFIC BARRIER AT MSE WALL OR MOMENT SLAB TYPE B MODIFIED | | DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | SHEET NO. 617.10M 3 OF 11 |

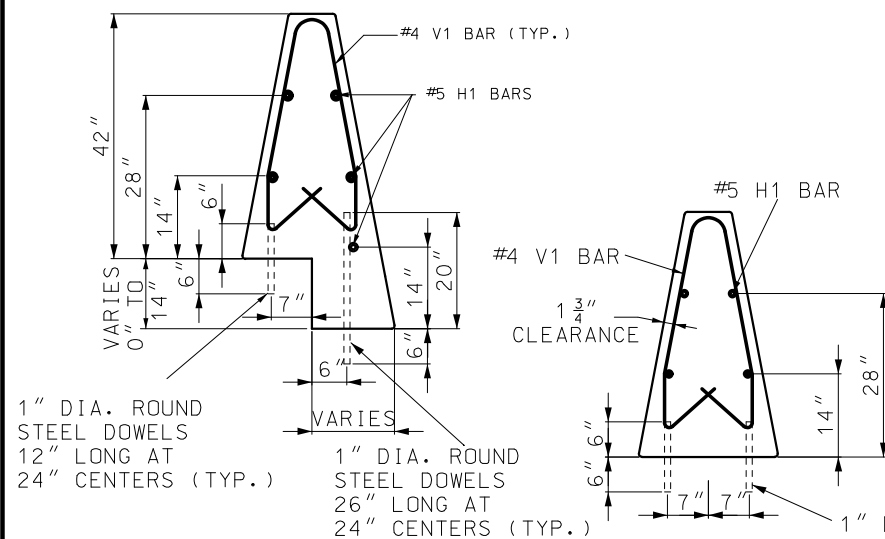


PLAN VIEW
(SYMMETRICAL ABOUT CENTERLINE)

LIMITS OF #4 - V1 SPACED AS SHOWN BELOW
AT TERMINAL ENDS OF BARRIER ONLY



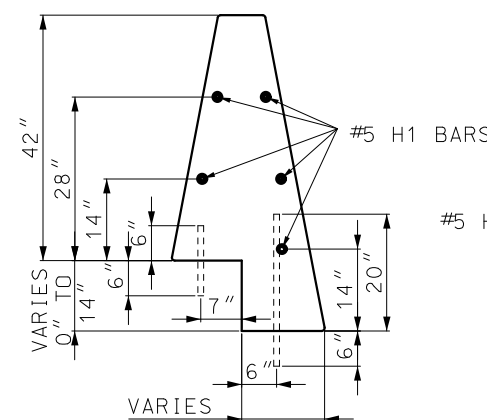
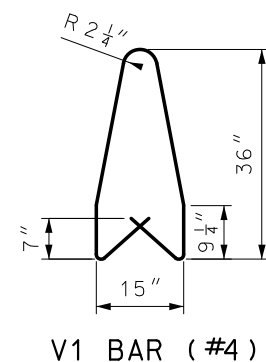
ELEVATION



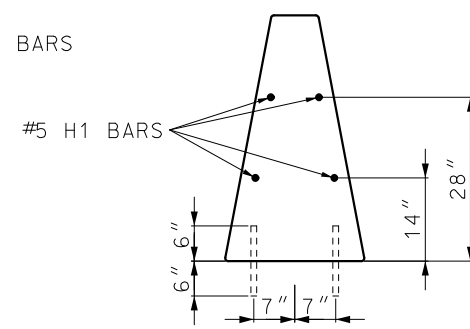
SECTION A-A
(STEPPED PAVEMENT)

SECTION A-A
(NORMAL PAVEMENT)

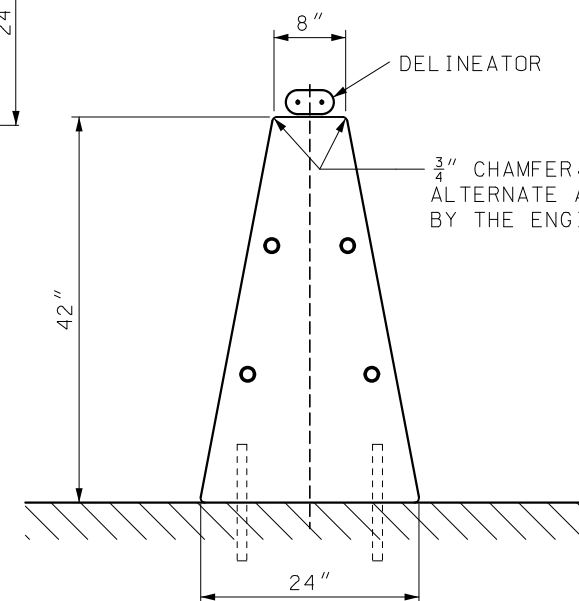
REINFORCING DETAILS



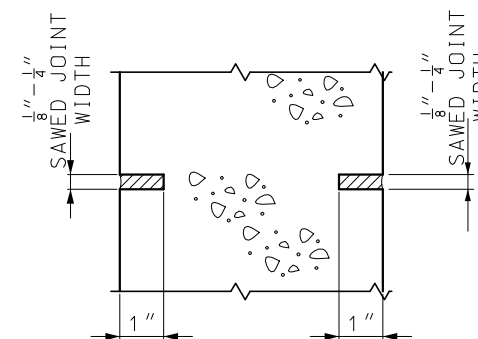
SECTION C-C
(STEPPED PAVEMENT)



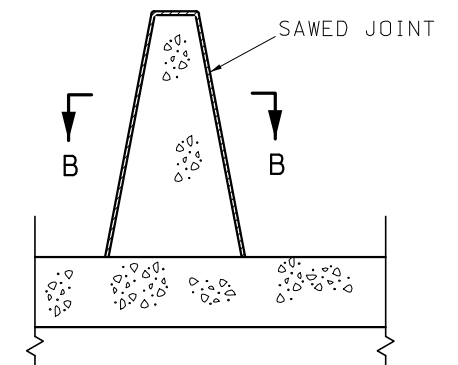
SECTION C-C
(NORMAL PAVEMENT)



TYPE C
TYPICAL SECTION



SECTION B-B



SECTION THROUGH SAWED JOINT

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

ANY REINFORCING BAR INSTALLATION METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED $\pm \frac{1}{2}$ INCH AS DIMENSIONED WILL BE SATISFACTORY.


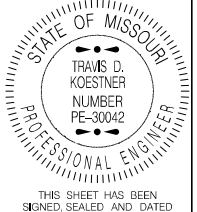
THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

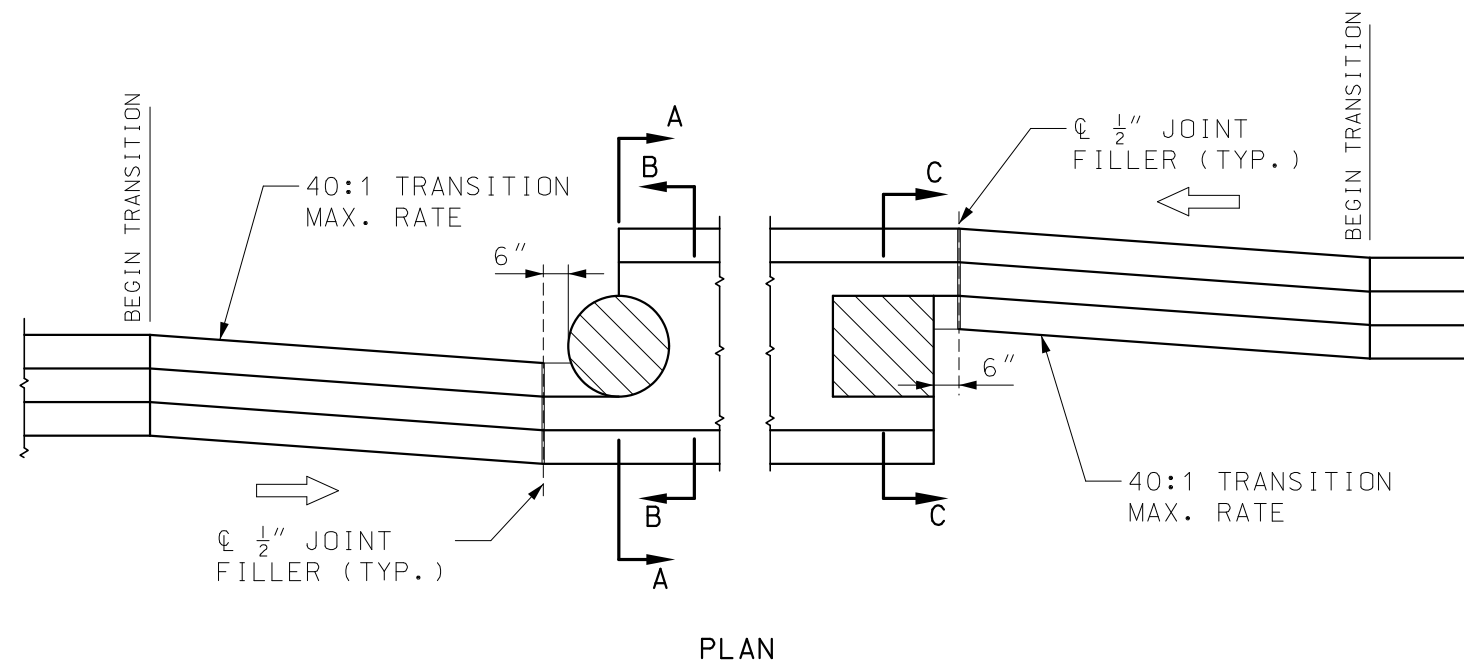
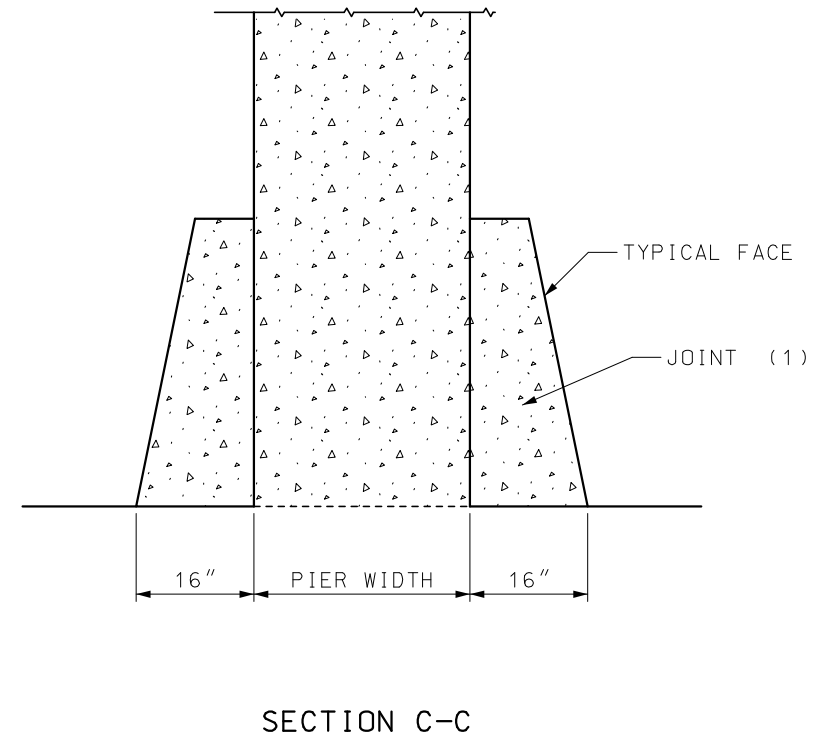
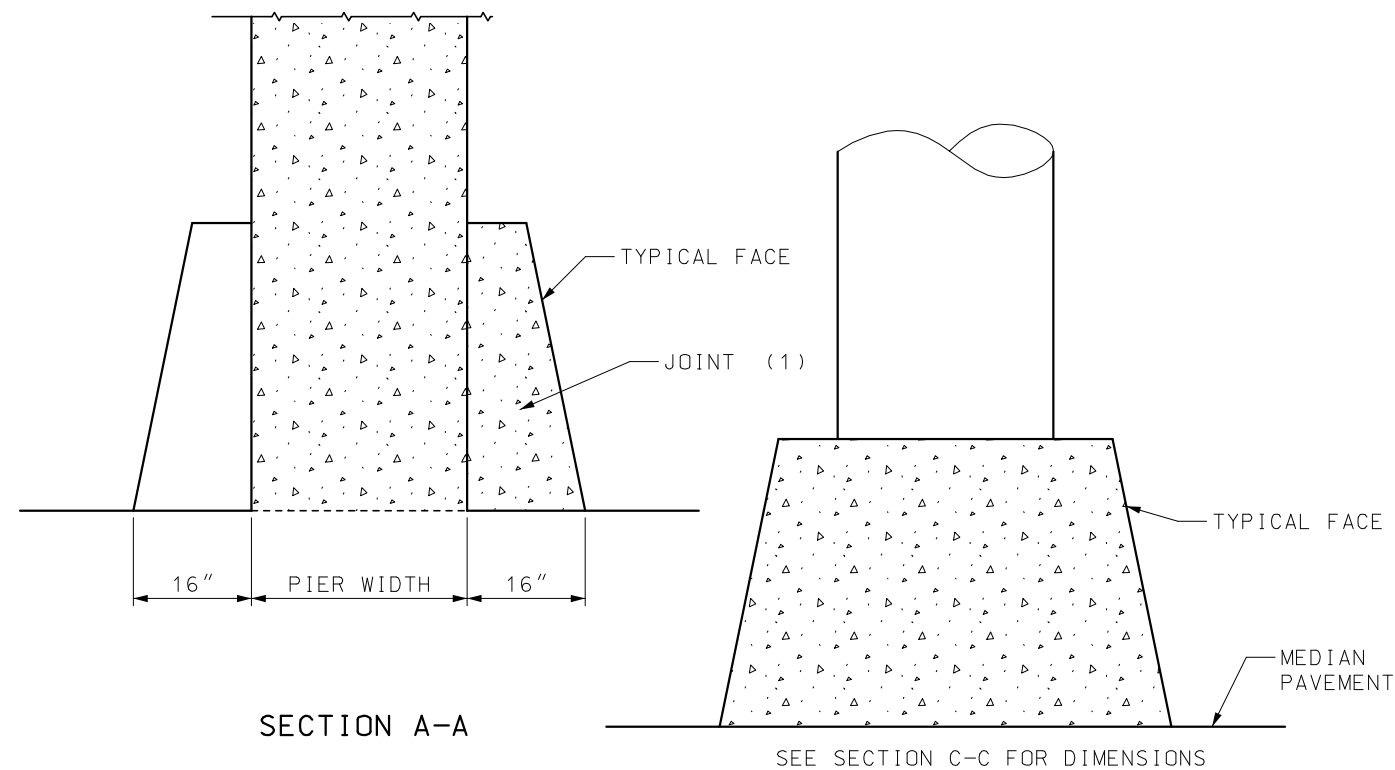
ANCHORING DOWELS MAY BE OMITTED WHEN THE PLANS SPECIFY A MINIMUM 1 3/4" PAVEMENT SURFACE TO BE PLACED ABUTTING BOTH BARRIER FACES.

SAWED JOINTS SHALL BE LOCATED AT PAVEMENT TRANSVERSE JOINTS.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.


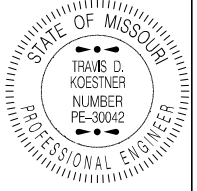
FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

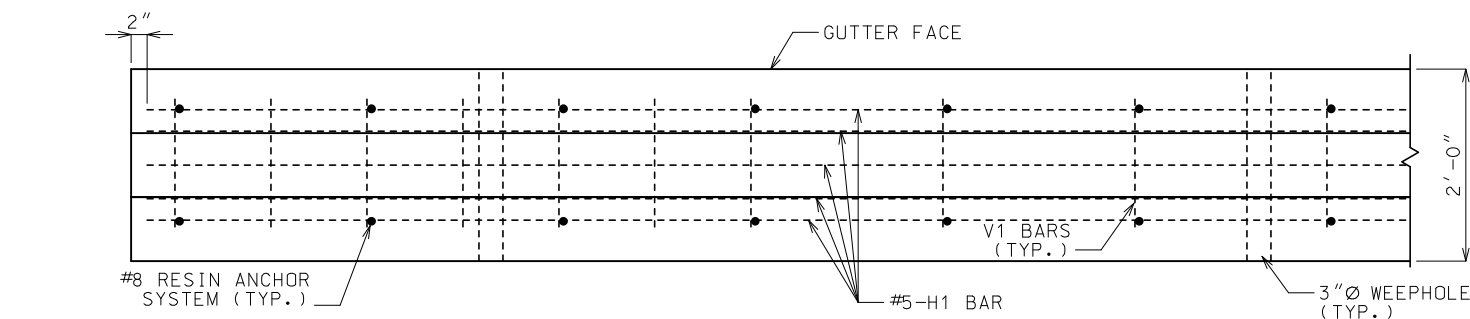
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | PERMANENT CONCRETE TRAFFIC BARRIER TYPE C |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | 617.10M SHEET NO. 4 OF 11 |



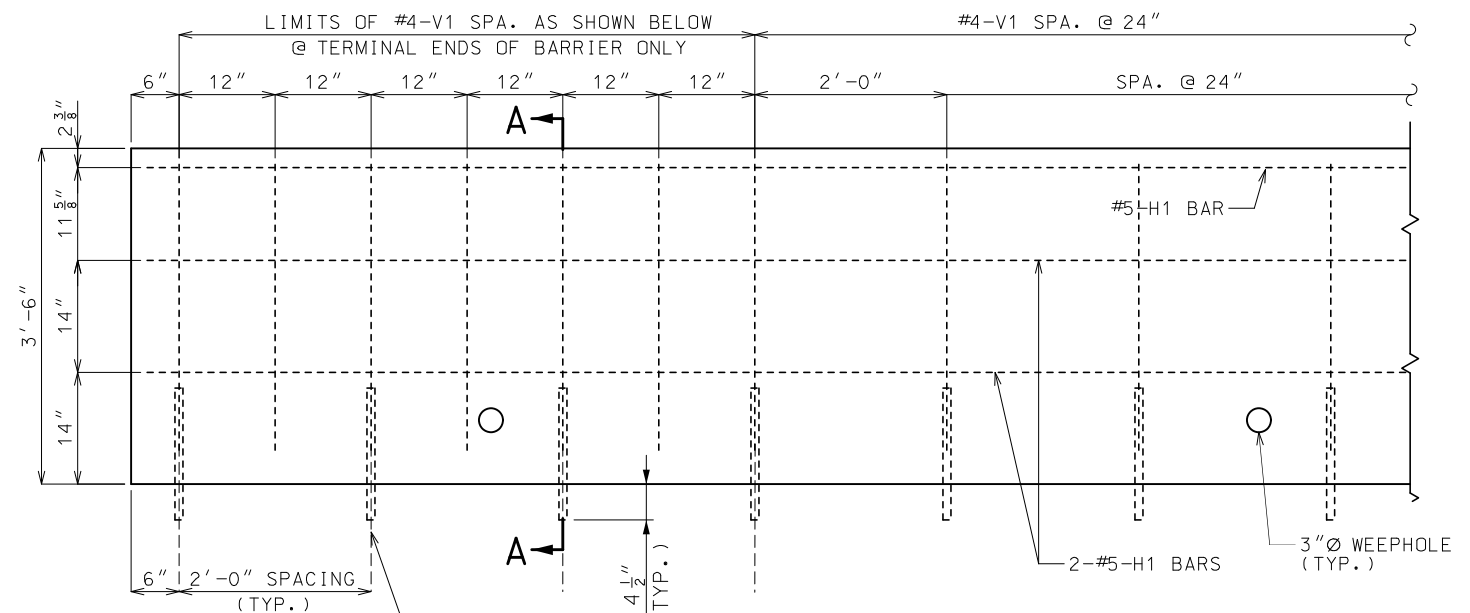
TRANSITION DETAILS FOR PIER PROTECTION

(1) 1 IN. JOINT WITH JOINT FILLER AND SEALER

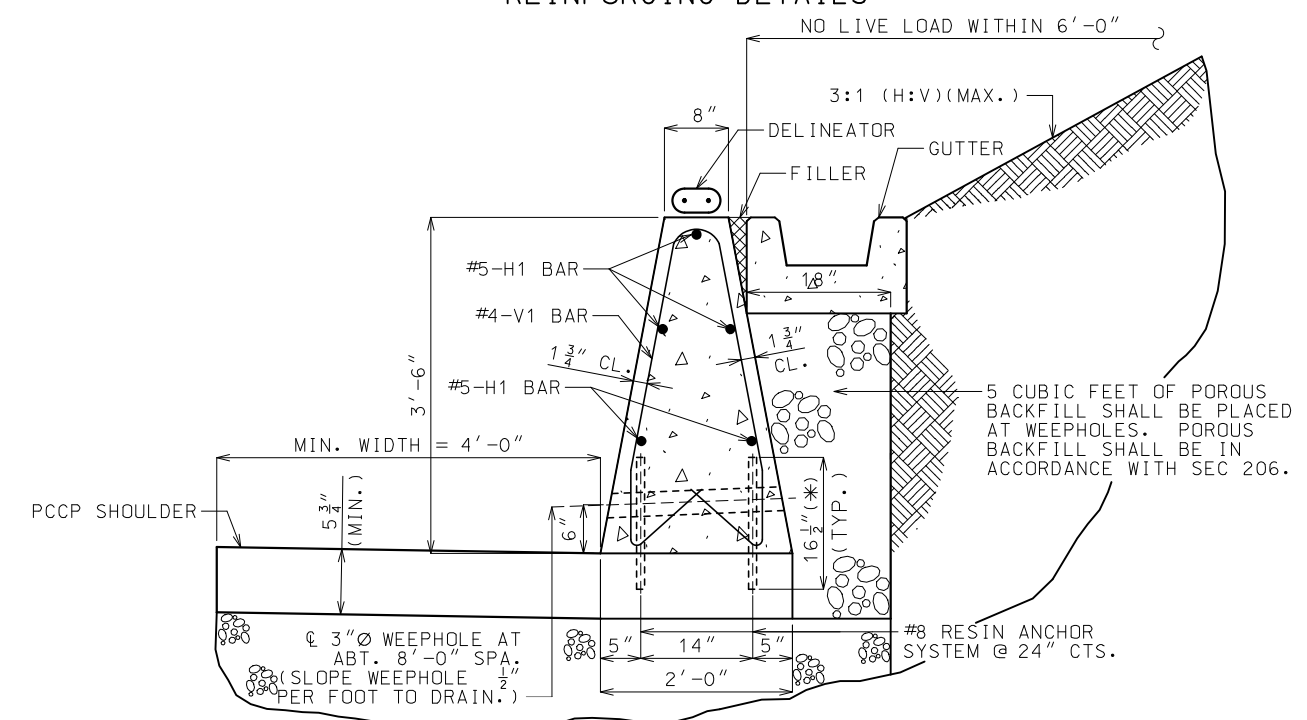
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|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PERMANENT CONCRETE TRAFFIC BARRIER TYPE C |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | SHEET NO. 617.10M 5 OF 11 |



PLAN VIEW
NOTE: GUTTER NOT SHOWN FOR CLARITY.

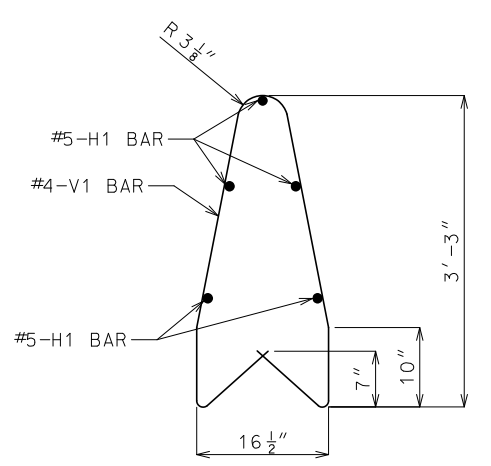


ELEVATION
REINFORCING DETAILS



SECTION A-A
(FOR SLOPING AND NONSLOPING BACKSLOPE)


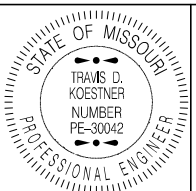
(*) EMBED ANCHOR 4 1/2 inches INTO PCCP SHOULDER.



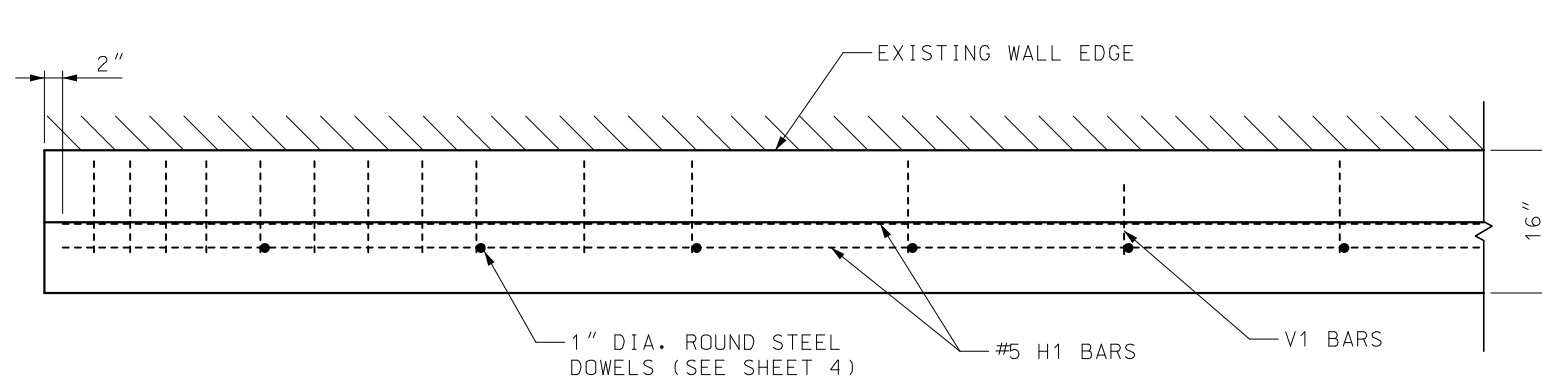
PART SECTION OF
#4-V1 BAR

GENERAL NOTES:

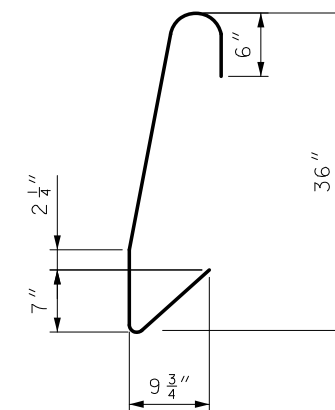
- CONCRETE SHALL BE CLASS B F'C = 4,000 PSI.
- ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.
- ANGLE OF INTERNAL FRICTION, $\phi \geq 27^\circ$ FOR BACKFILL MATERIAL.
- MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 inches, UNLESS OTHERWISE SHOWN.
- BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.
- ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED $\pm 1/2$ INCH AS DIMENSIONED WILL BE SATISFACTORY.
- THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.
- THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.
- THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.
- SAWED JOINTS SHALL BE SPACED AT 15 feet 0 inches. SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.
- TYPE C BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.
- FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.
- RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.
- WHEN BARRIER HEIGHT EXCEEDS 42 inches OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN 6 feet 0 inches, CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PERMANENT CONCRETE TRAFFIC BARRIER TYPE C AS RETAINING WALL |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | SHEET NO. 617.10M 6 OF 11 |

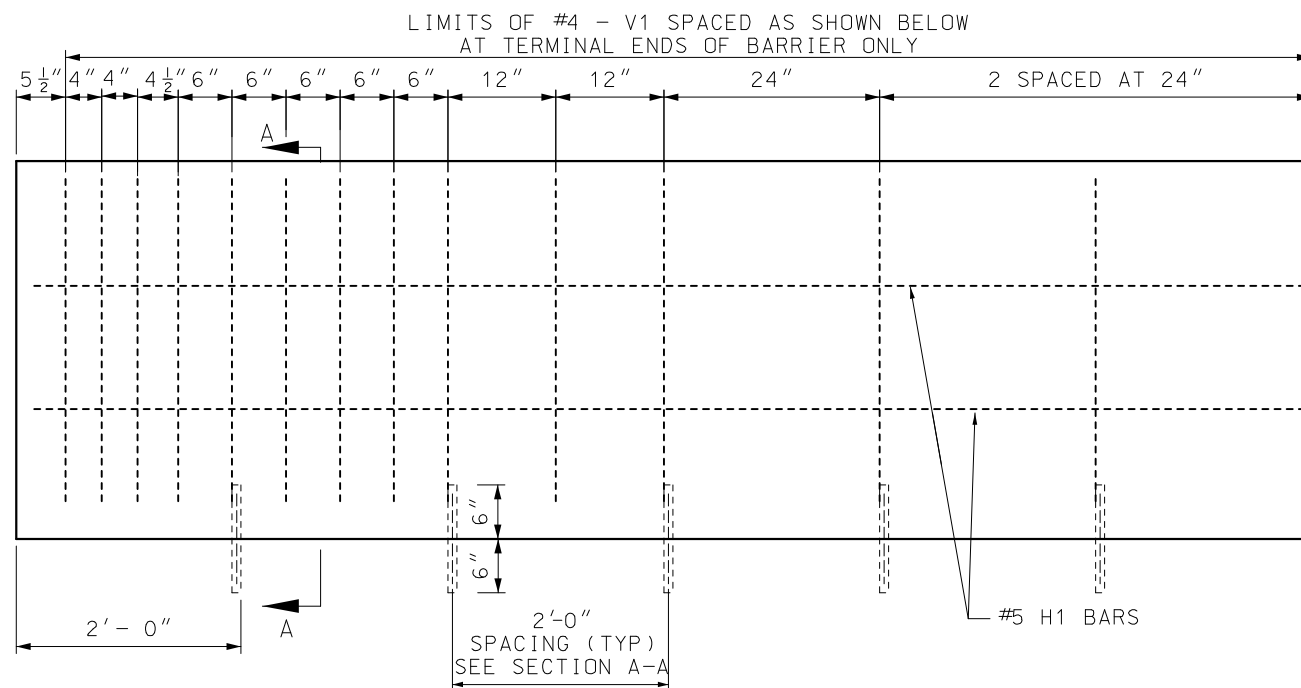
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



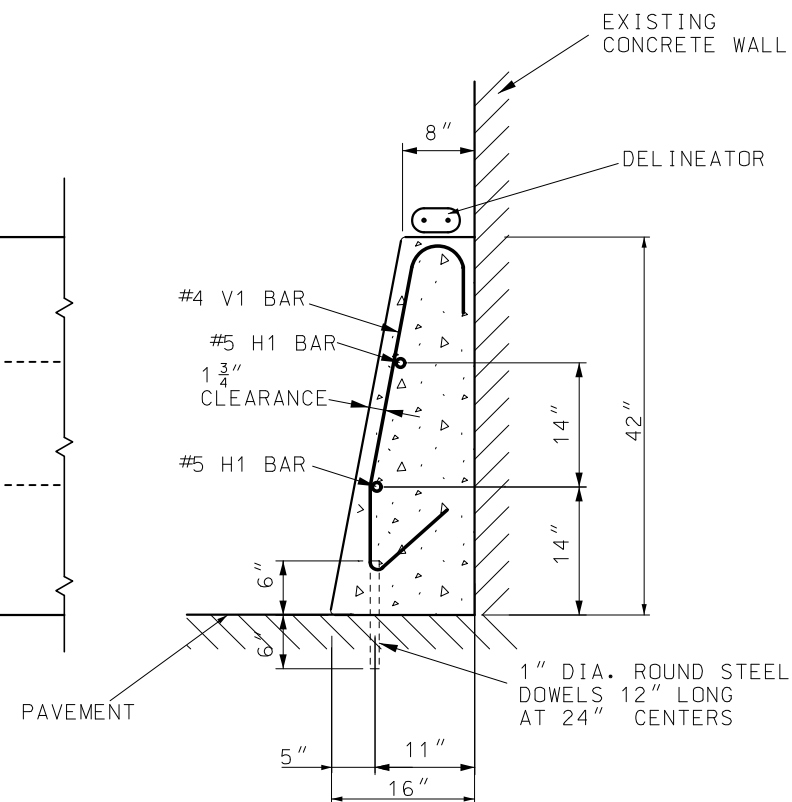
PLAN VIEW



V1 BAR (#4)



ELEVATION
REINFORCING DETAILS



SECTION A-A

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED $\pm \frac{1}{2}$ INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.

SAWED JOINTS SHALL BE LOCATED AT PAVEMENT TRANSVERSE JOINTS.

TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

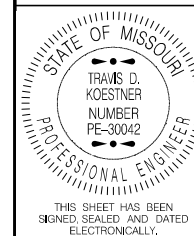
#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

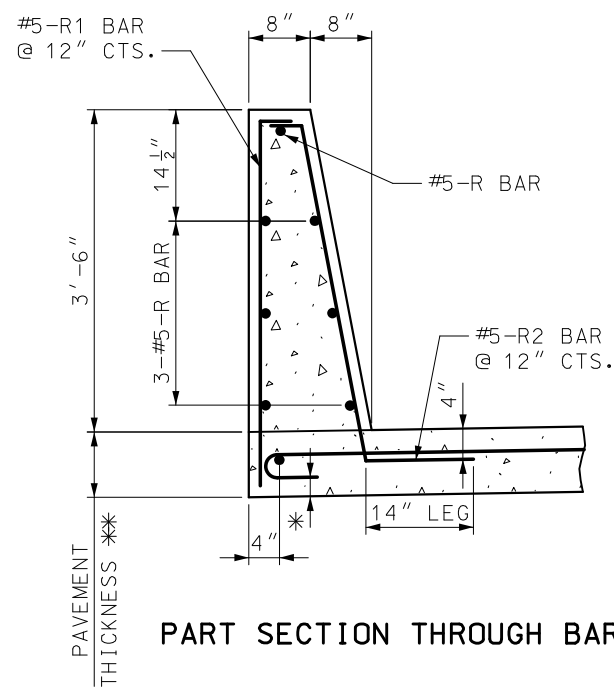


PERMANENT CONCRETE
TRAFFIC BARRIER
TYPE D

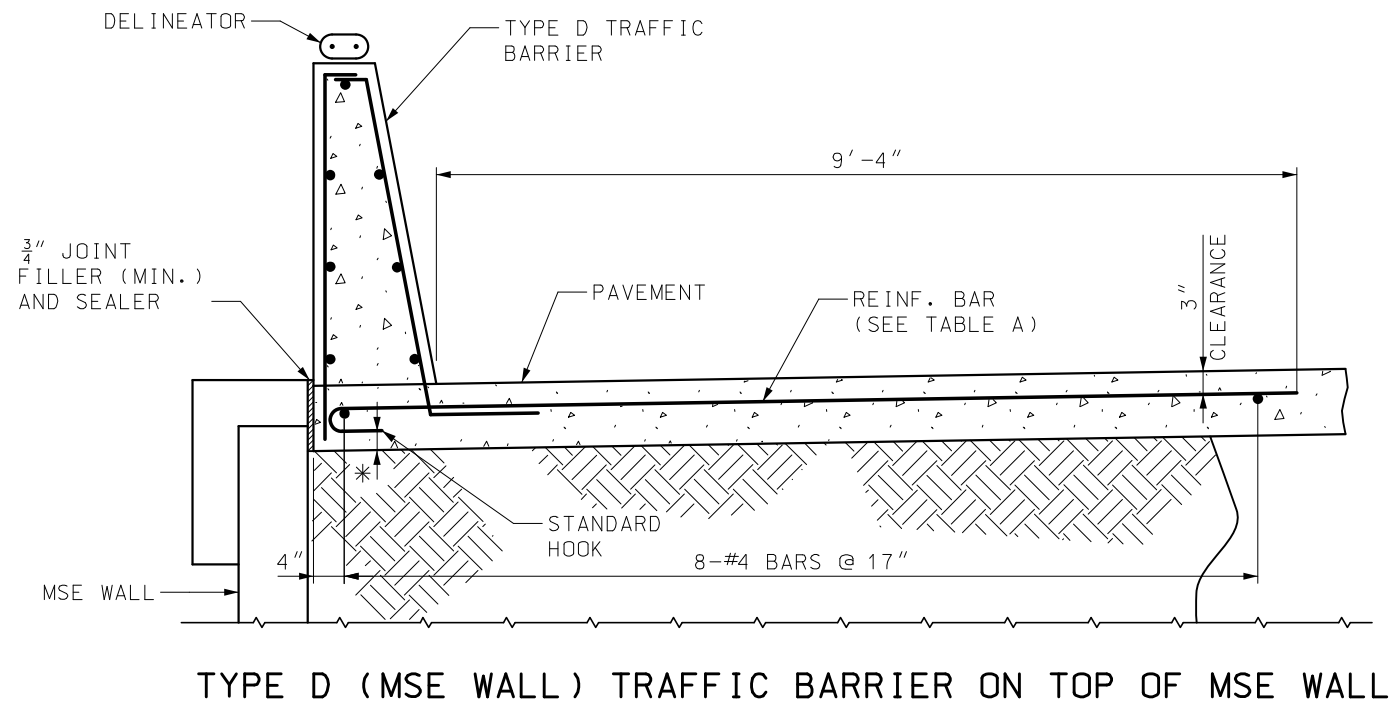
DATE EFFECTIVE: 10/01/2020
DATE PREPARED: 7/21/2020

617.10M

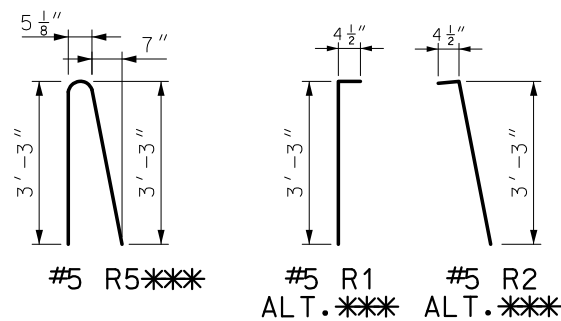
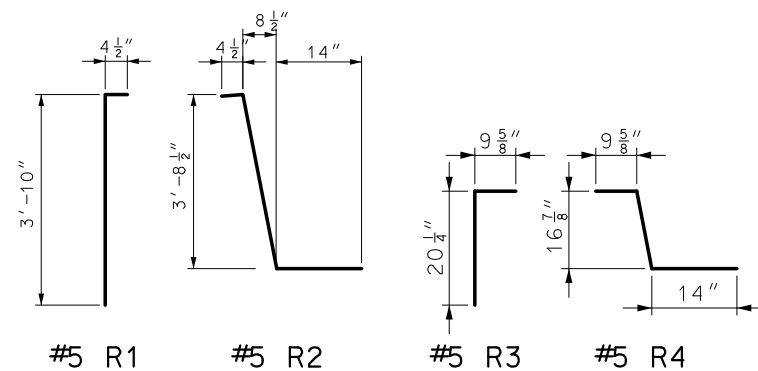
SHEET NO.
7 OF 11



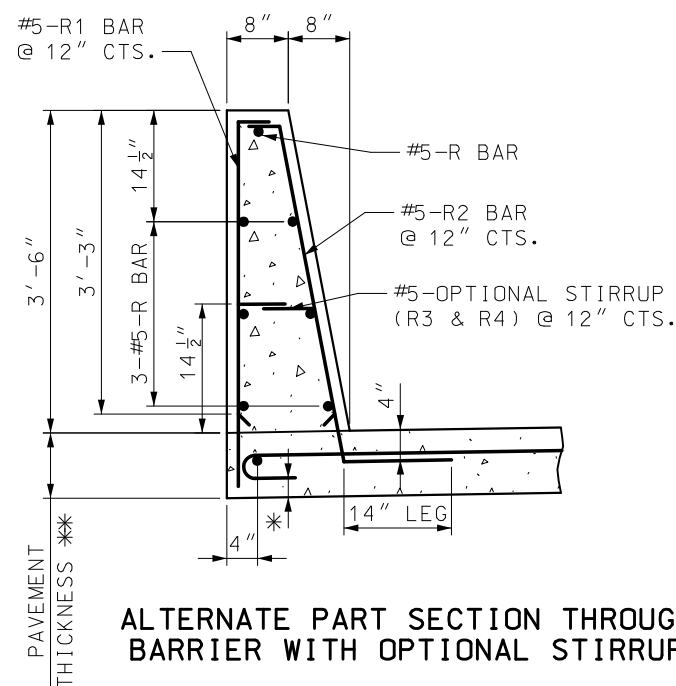
PART SECTION THROUGH BARRIER



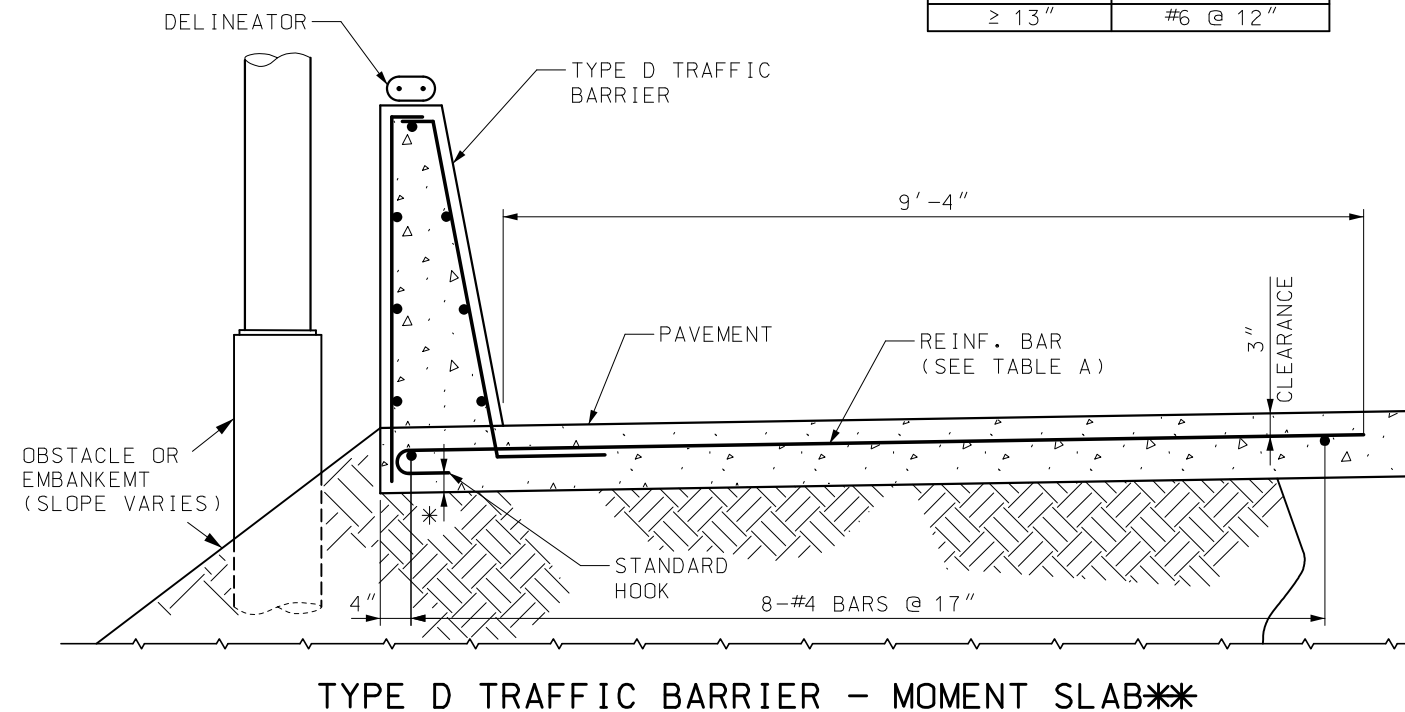
TYPE D (MSE WALL) TRAFFIC BARRIER ON TOP OF MSE WALL



| TABLE A TRANSVERSE PAVEMENT REINFORCEMENT | |
|---|--------------------------|
| PAVEMENT THICKNESS ** | BAR SIZE & SPACING |
| 8" | #5 @ 4"* |
| 9" | #5 @ 5"* |
| 10" | #5 @ 6" |
| 11" | #5 @ 7" |
| 12" | #6 @ 12" |
| ≥ 13" | #6 @ 12" |

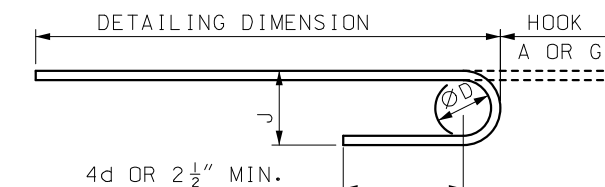
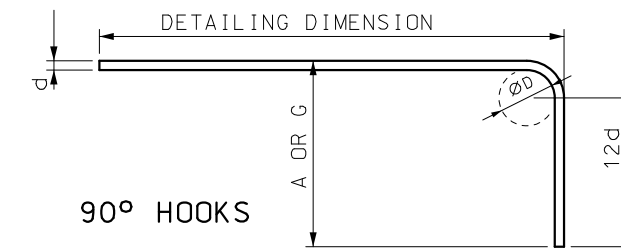


ALTERNATE PART SECTION THROUGH BARRIER WITH OPTIONAL STIRRUP



TYPE D TRAFFIC BARRIER - MOMENT SLAB**

| END HOOK DIMENSIONS | | | | |
|---------------------|------------|------------|-----------|--------|
| BAR SIZE | D (IN.) | ALL GRADES | | |
| | | 180° HOOKS | 90° HOOKS | |
| | | A OR G | J | A OR G |
| #5 | 3 3/4" | 7" | 5" | 10" |
| #6 | 4 1/2" | 8" | 6" | 12" |



180° HOOKS

ALL STANDARD HOOKS AND BENDS OTHER THAN 180° TO BE BENT WITH THE SAME PROCEDURE AS FOR 90° STANDARD HOOKS.

NOTES:

TYPE D SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.


NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2" UNLESS OTHERWISE SHOWN.

* TILT TRANSVERSE PAVEMENT REINFORCEMENT HOOKS FROM VERTICAL ALIGNMENT TO MAINTAIN 1 1/2" MINIMUM CLEARANCE.

** SEE ROADWAY PAVEMENT DESIGN.

*** R1 AND R2 MAY BE REPLACED WITH ALTERNATE (3'-3") R1 AND R2 OR R5 ONLY FOR USE WITH OPTIONAL STIRRUP.

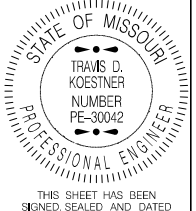


MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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PERMANENT CONCRETE TRAFFIC BARRIER

TYPE D ATOP MSE WALL AND MOMENT SLAB



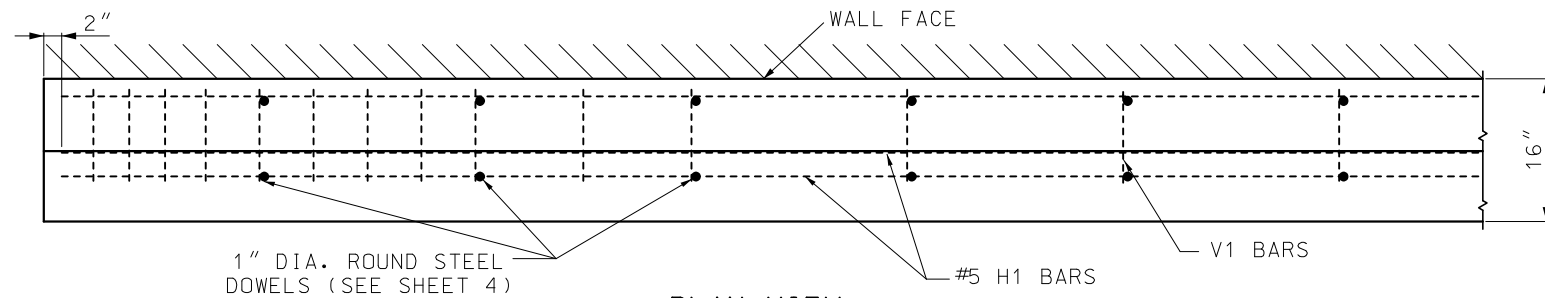
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/01/2020

DATE PREPARED: 7/21/2020

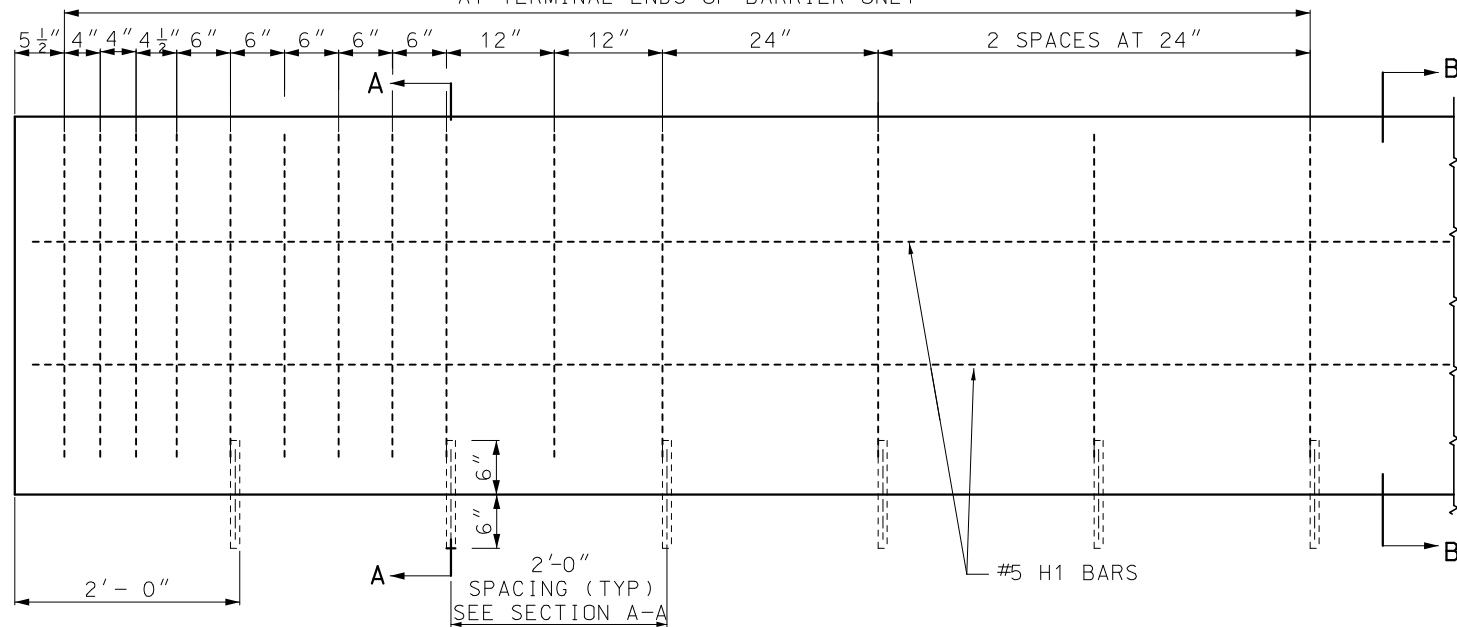
617.10M

SHEET NO. 8 OF 11

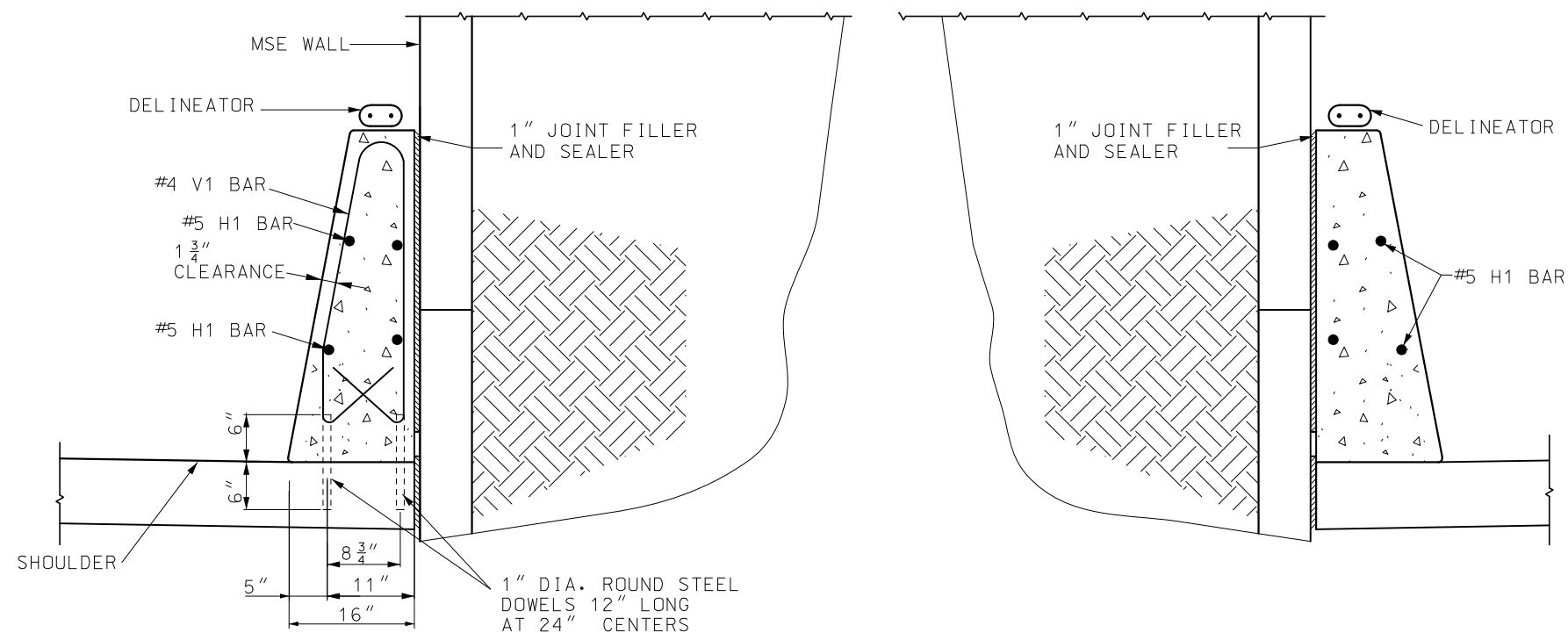


PLAN VIEW

LIMITS OF #4 - V1 SPACED AS SHOWN BELOW
AT TERMINAL ENDS OF BARRIER ONLY

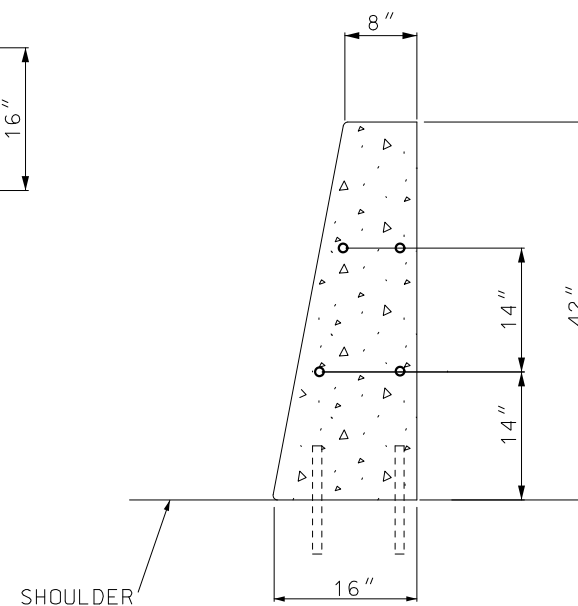


ELEVATION
REINFORCING DETAILS

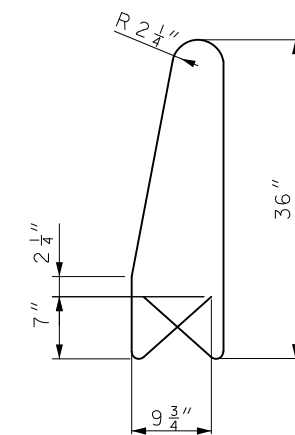


SECTION A-A

SECTION B-B



TYPE D TYPICAL SECTION



V1 BAR (#4)

NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REINFORCING STEEL WILL BE POSITIONED $\pm \frac{1}{2}$ INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.


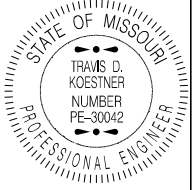
THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATIONS.

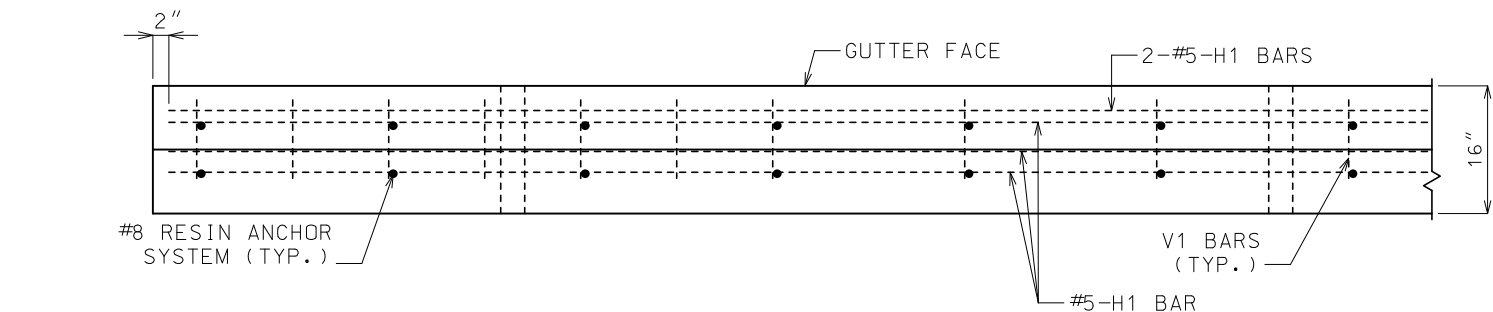
SAWED JOINTS SHALL BE SPACED AT 15'-0". SEE STANDARD PLANS FOR SAWED JOINT DETAIL

TYPE D BARRIER SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

#8 REINFORCING BARS WITH AN EPOXY ANCHOR SYSTEM MAY BE SUBSTITUTED FOR SMOOTH 1" DIAMETER ROUND STEEL DOWELS.

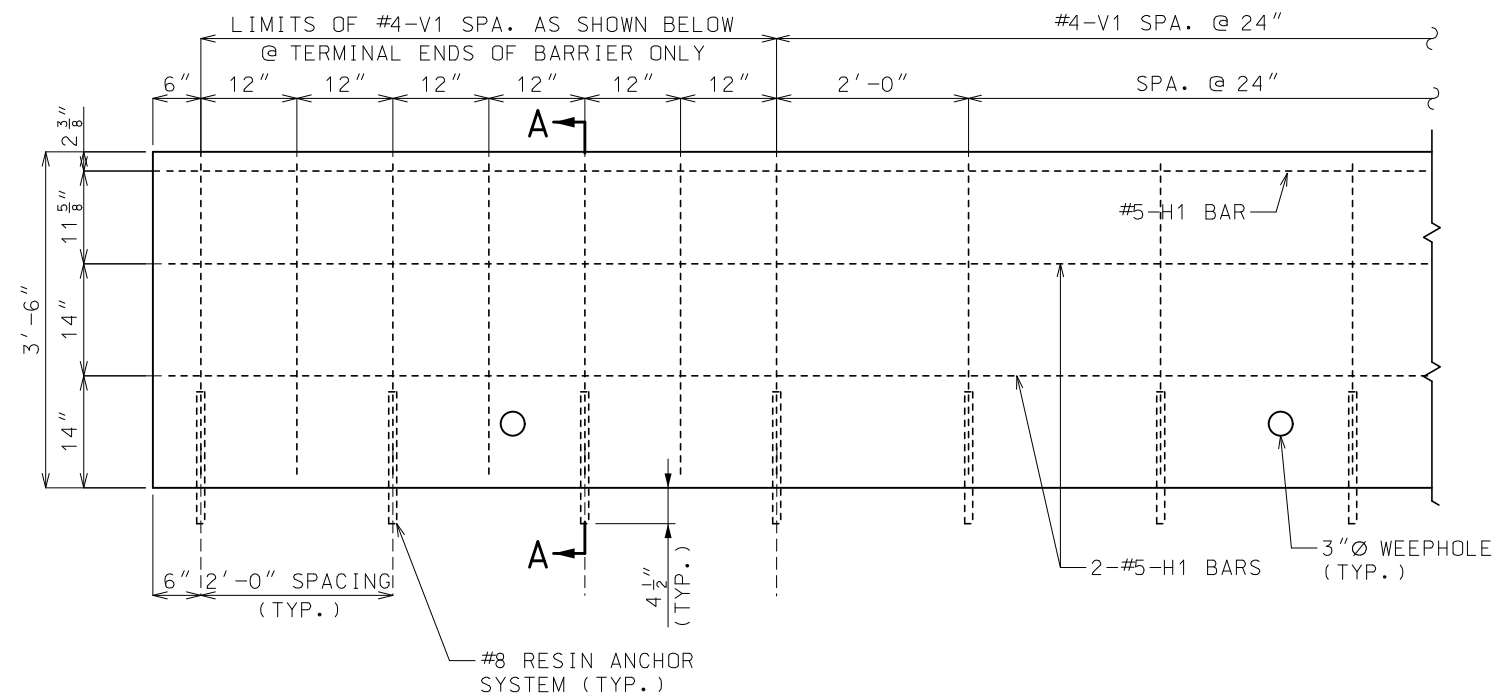
FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  TRAVIS D. KOESTNER NUMBER PE-30042 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | PERMANENT CONCRETE TRAFFIC BARRIER TYPE D BESIDE MSE WALL |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | 617.10M SHEET NO. 9 OF 11 |

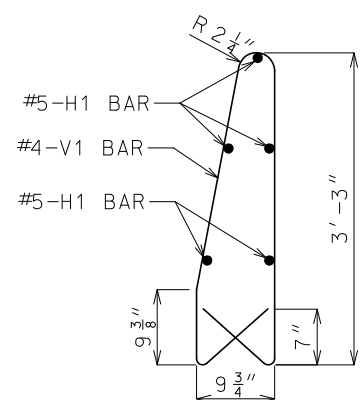


PLAN VIEW

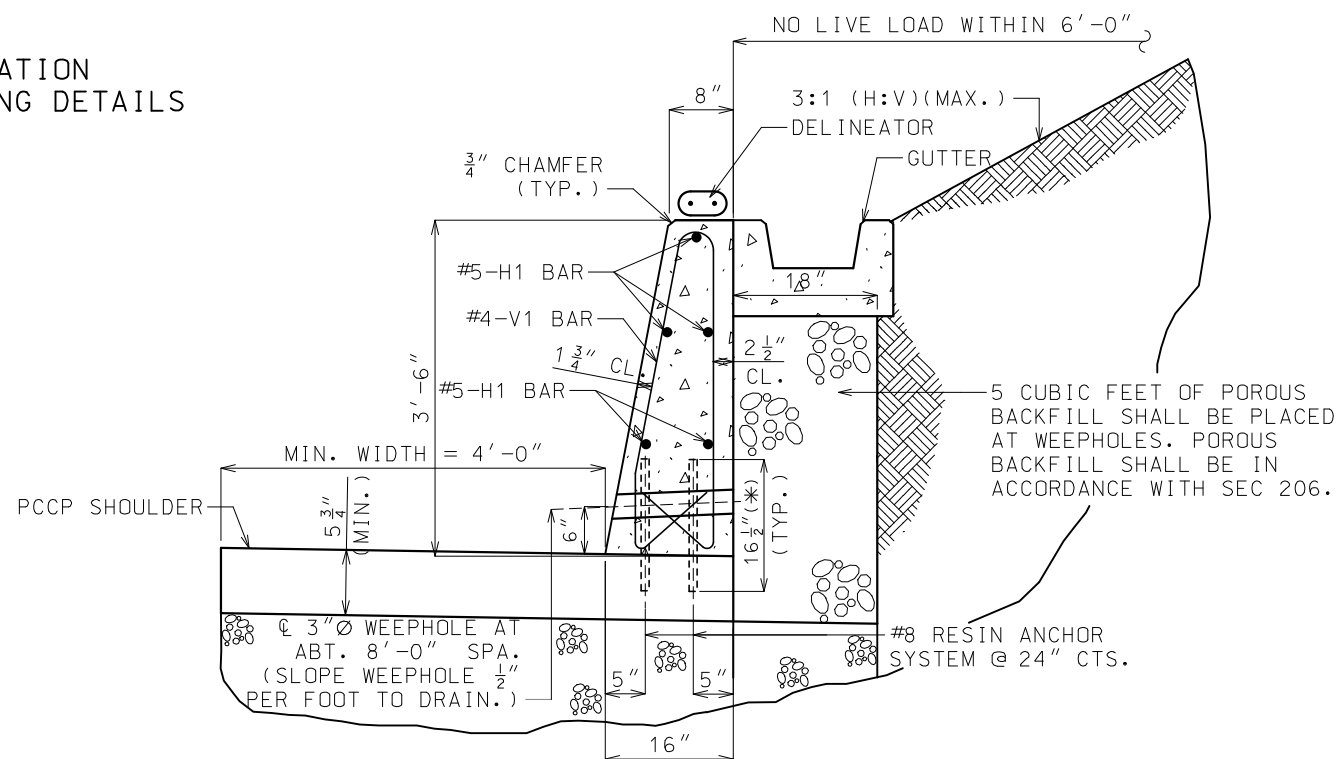
NOTE: GUTTER NOT SHOWN FOR CLARITY.



ELEVATION
REINFORCING DETAILS



PART SECTION OF
#4-V1 BAR



SECTION A-A
(FOR SLOPING AND NONSLOPING BACKSLOPE)

GENERAL NOTES:

CONCRETE SHALL BE CLASS B $f'_c = 4,000$ PSI.

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.

ANGLE OF INTERNAL FRICTION, $\phi_f \geq 30^\circ$ FOR BACKFILL MATERIAL.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ " UNLESS OTHERWISE SHOWN.

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OR THE BAR.

ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL REFORCING STEEL WILL BE POSITIONED $\pm 1/2$ INCH AS DIMENSIONED WILL BE SATISFACTORY.

THE CONTRACTOR HAS THE OPTION TO SLIP-FORM THE BARRIER. IN WHICH CASE, ADDITIONAL REINFORCEMENT MAY BE TIED TO THE UPPER TWO-THIRDS OF THE REINFORCING CAGE TO PROVIDE BRACING.

THIS BARRIER SHALL NOT BE USED TO SUPPORT HIGHWAY LIGHTING POLES.

THIS BARRIER SHALL NOT BE USED FOR BRIDGE ROADWAY APPLICATION.


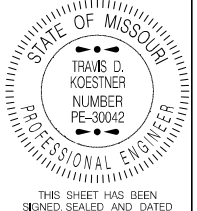
SAWED JOINTS SHALL BE SPACED AT $15'-0"$. SEE MISSOURI STANDARD PLANS FOR SAWED JOINT DETAIL.

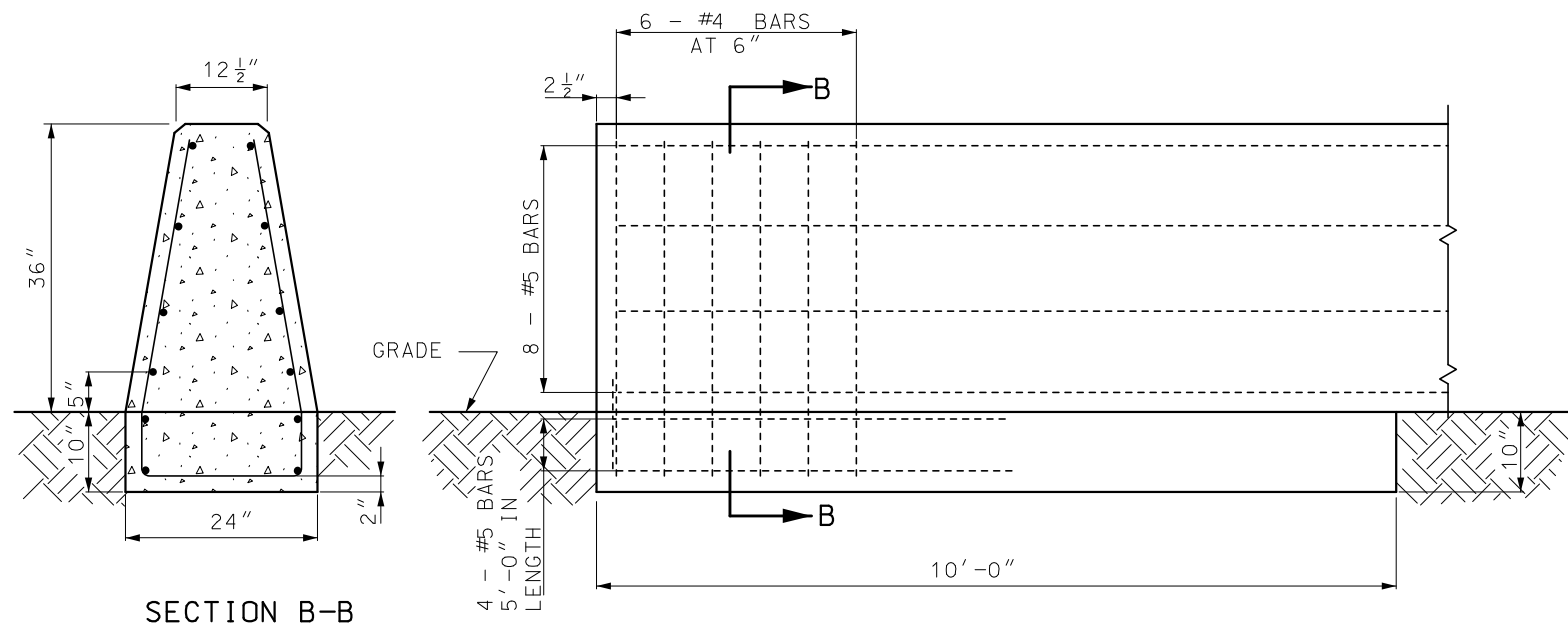
TYPE D BARRIER MODIFIED RETAINING WALL WITH NONMOMENT SLAB SHALL BE USED ONLY AT LOCATIONS SHOWN ON PLANS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

RESIN ANCHOR SYSTEM SHALL BE DRILLED IN THE PAVEMENT.

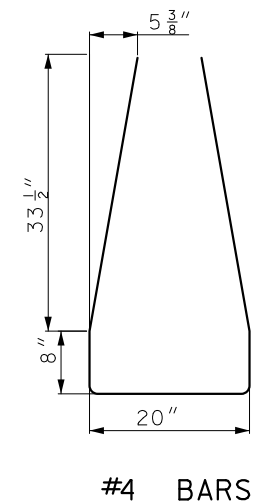
WHEN BARRIER HEIGHT EXCEEDS $42"$ OR SLOPE EXCEEDS 3:1 (H:V) OR LIVE LOAD IS WITHIN $6'-0"$, CONTACT BRIDGE DIVISION FOR SPECIAL DESIGN.

| | | |
|--|---|---------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | PERMANENT CONCRETE TRAFFIC BARRIER TYPE D AS RETAINING WALL | |
| | DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | 617.10M |

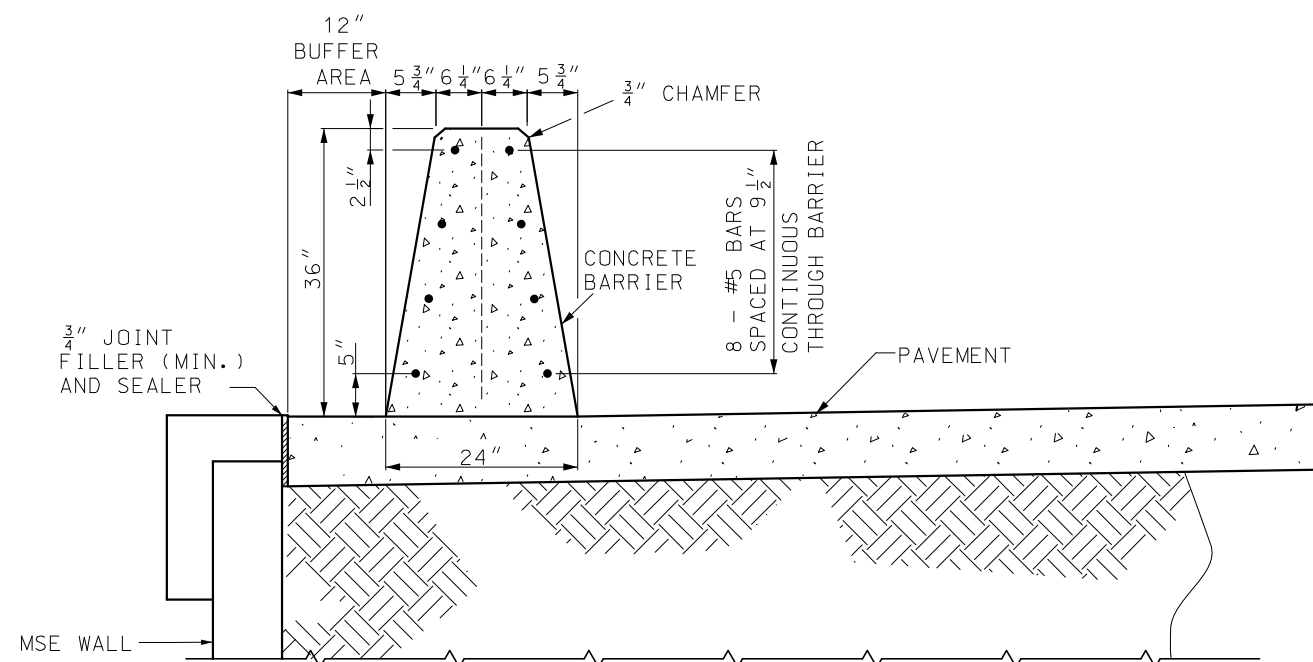


SECTION B-B

CONCRETE BARRIER END ANCHORAGE ON GRADE



#4 BARS



TRAFFIC BARRIER ON TOP OF MSE WALL

GENERAL NOTES:

ALL REINFORCEMENT SHALL BE GRADE 60 EPOXY COATED.


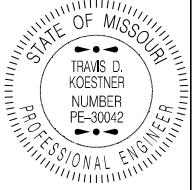
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2", UNLESS OTHERWISE SHOWN.

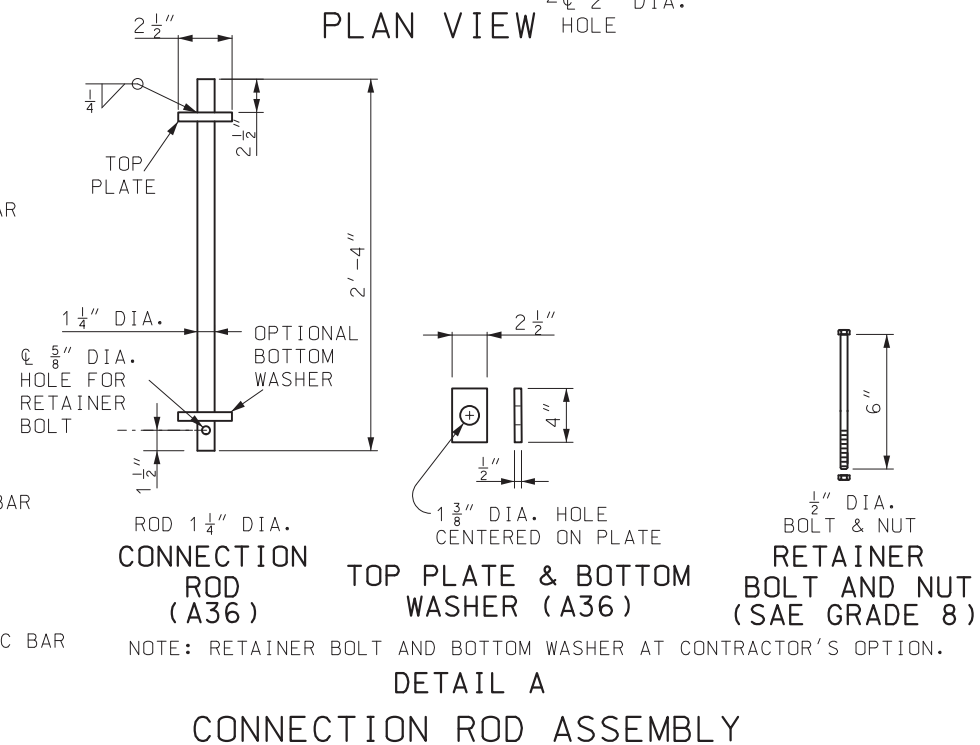
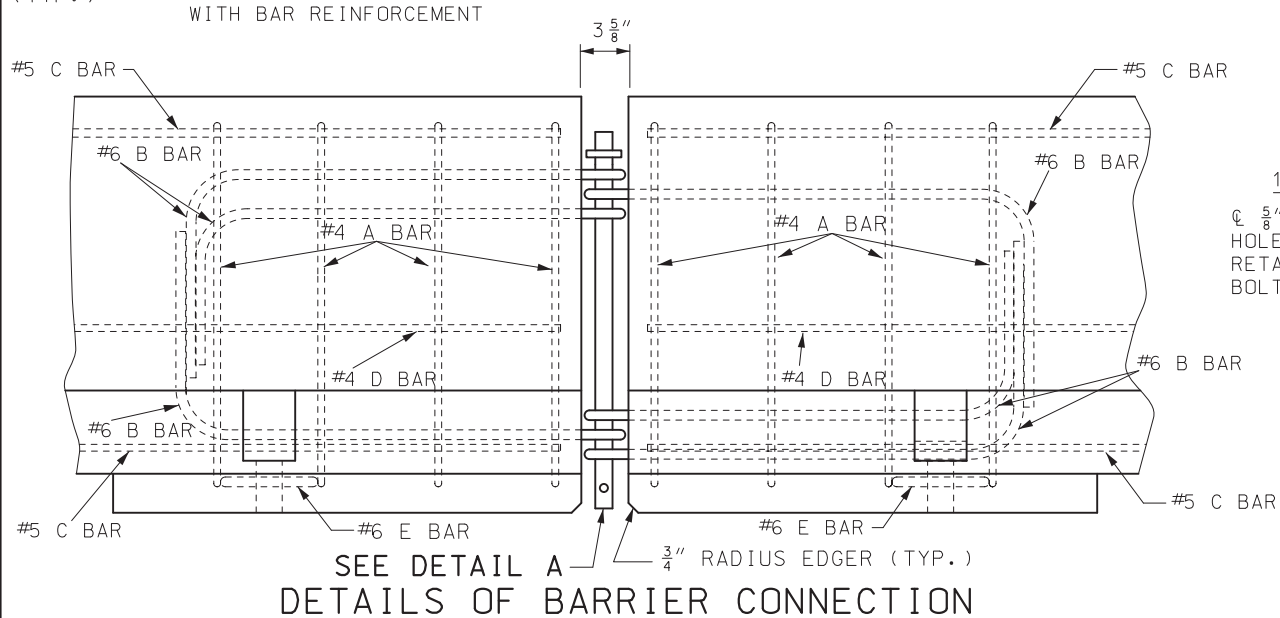
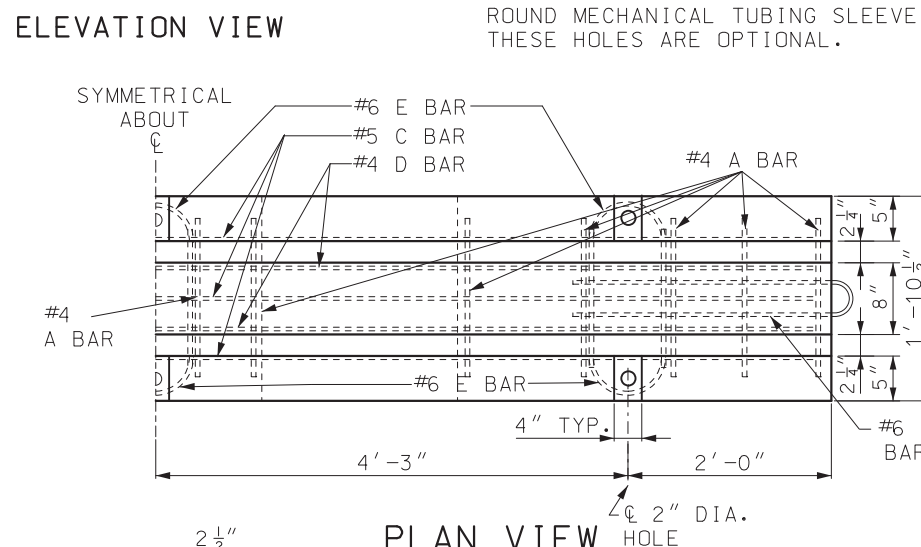
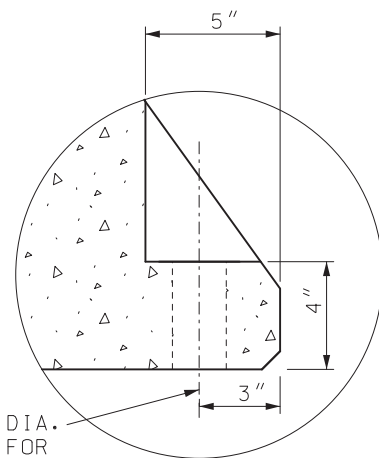
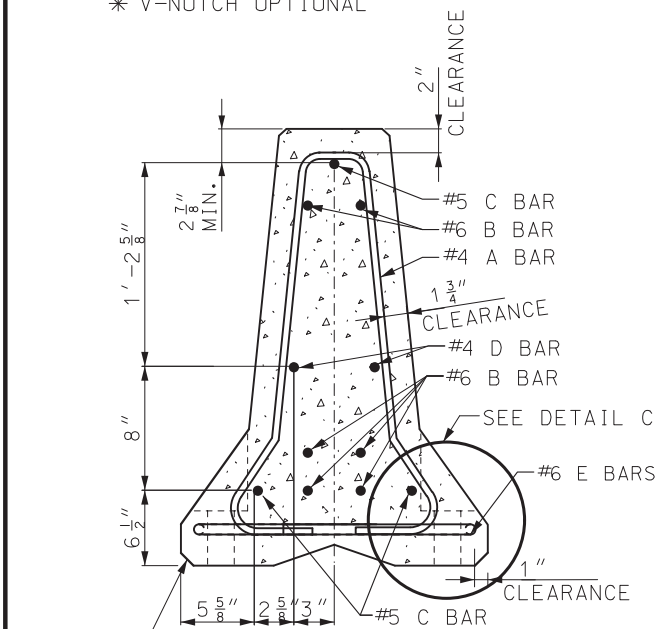
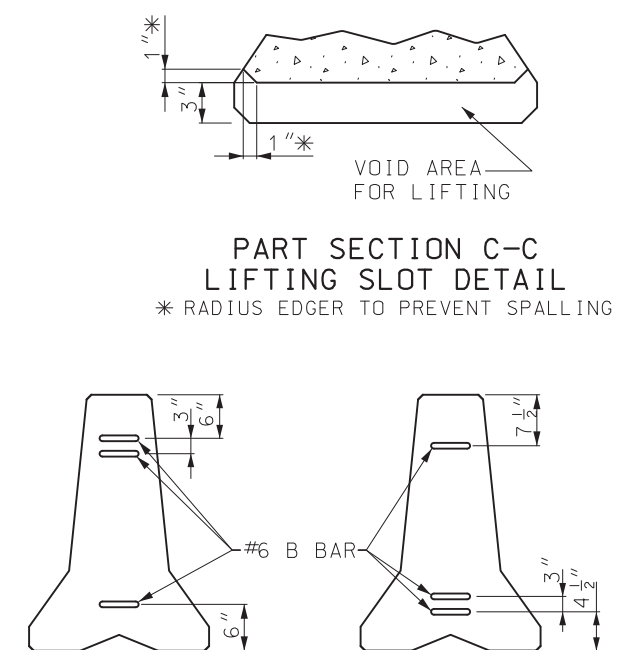
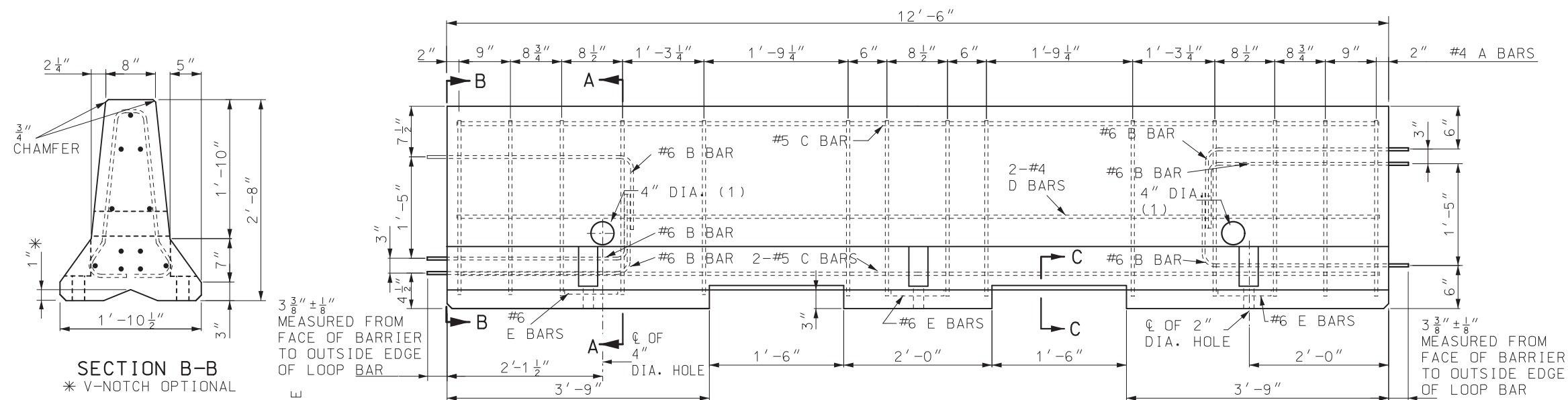
A 12" BUFFER REQUIRED WITHIN THE LIMITS OF THE TRAFFIC BARRIER EXCLUDING THE END ANCHORAGE SECTIONS.

FOR CONCRETE TRAFFIC BARRIER DELINEATION DETAILS SEE STD PLAN 903.03.

PAVEMENT SURFACE DIFFERENTIAL SHALL NOT EXCEED 1 1/2".

BAR SPLICES SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PERMANENT CONCRETE TRAFFIC BARRIER</p> <p>TYPE E ATOP MSE WALL</p> |
| DATE EFFECTIVE: 10/01/2020 DATE PREPARED: 7/21/2020 | 617.10M |
| SHEET NO. 11 OF 11 | |



GENERAL NOTES:

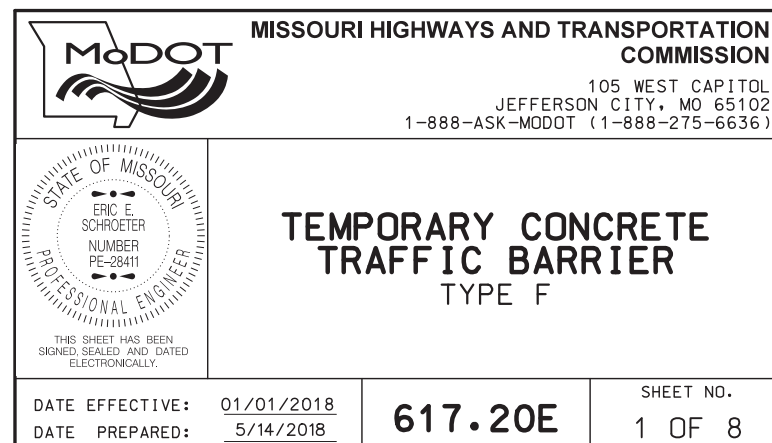
ALL REINFORCING SHALL MEET REQUIREMENTS OF CRSI
EXCEPT WHERE SHOWN ON PLANS.

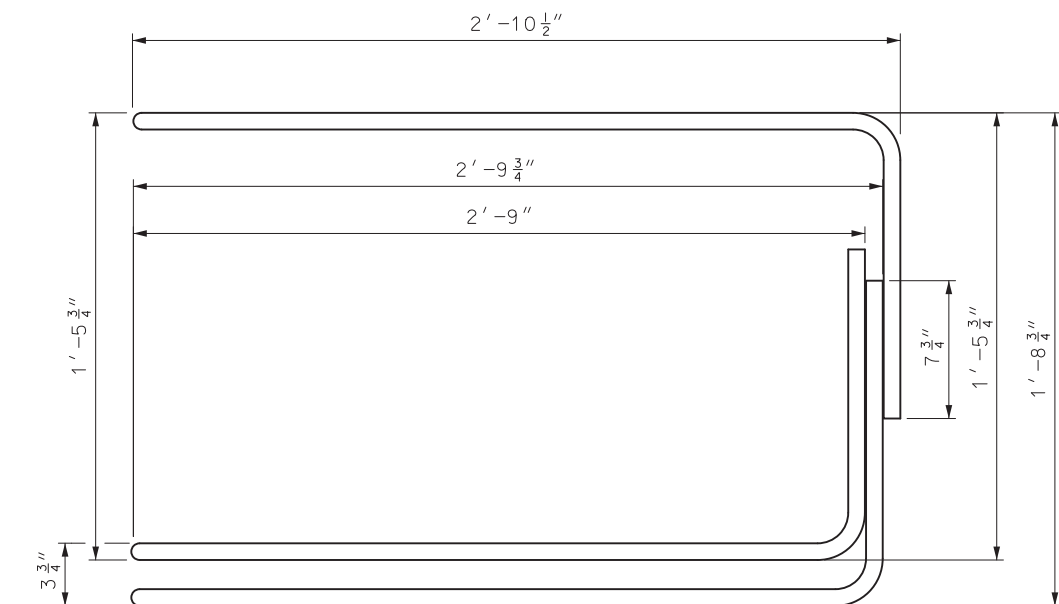
REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL
BE $1\frac{3}{4}$ " UNLESS OTHERWISE SHOWN.

AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY
USE OF THE LOOP BARS.

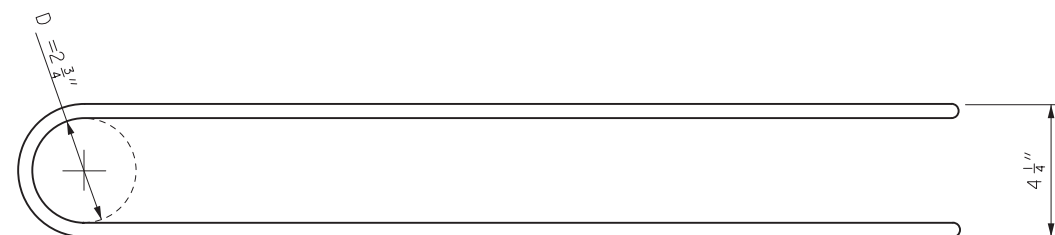
THE SECTION FURNISHED SHALL COMPLY WITH DIMENSIONS SHOWN, AS APPROVED BY THE ENGINEER.

SEE SHEET 3 FOR DELINEATOR DETAILS.

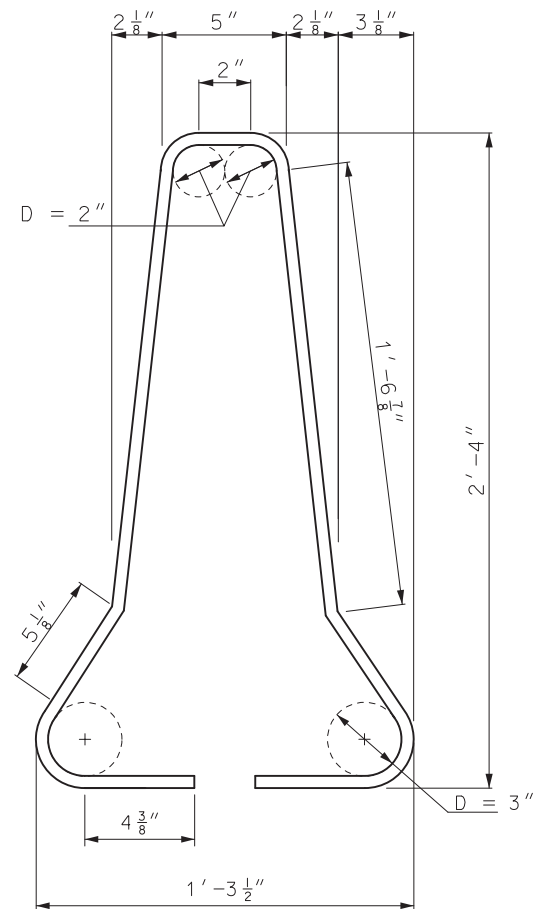




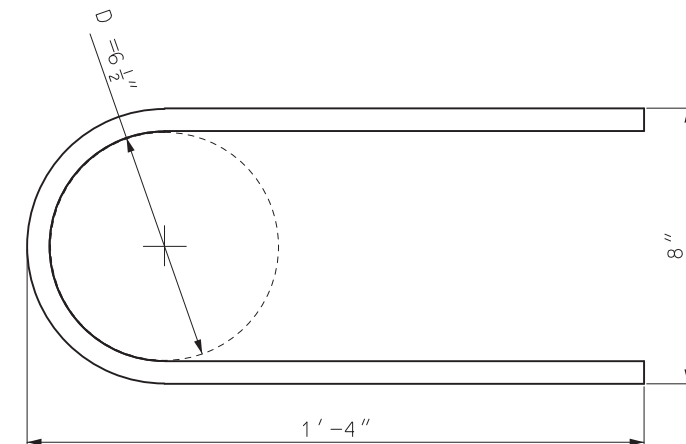
#6 B BAR ELEVATION



#6 B BAR PLAN



#4 A BARS



#6 E BAR

| REINFORCING BARS | | | | | |
|-----------------------------|----------|-------------|---------------|---------------------|----------|
| PER 12'- 6" BARRIER SECTION | | | | | |
| MARK | BAR SIZE | NO. OF BARS | SHAPE OF EACH | LENGTH EACH (NOM.) | WEIGHT |
| A | 4 | 14 | | 6'-5" | 60.8 lbs |
| C | 5 | 3 | | 12'-2" | 38.1 lbs |
| D | 4 | 2 | | 12'-2" | 16.3 lbs |
| E | 6 | 6 | | 2'-11" | 26.3 lbs |
| LOOP ASSEMBLY | | | | | |
| B | 6 | 6 | | 7'-10" | 70.5 lbs |

CONCRETE VOLUME 1.3 CU YDS APPROXIMATE WEIGHT 5601 LBS.

GENERAL NOTE:

DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.

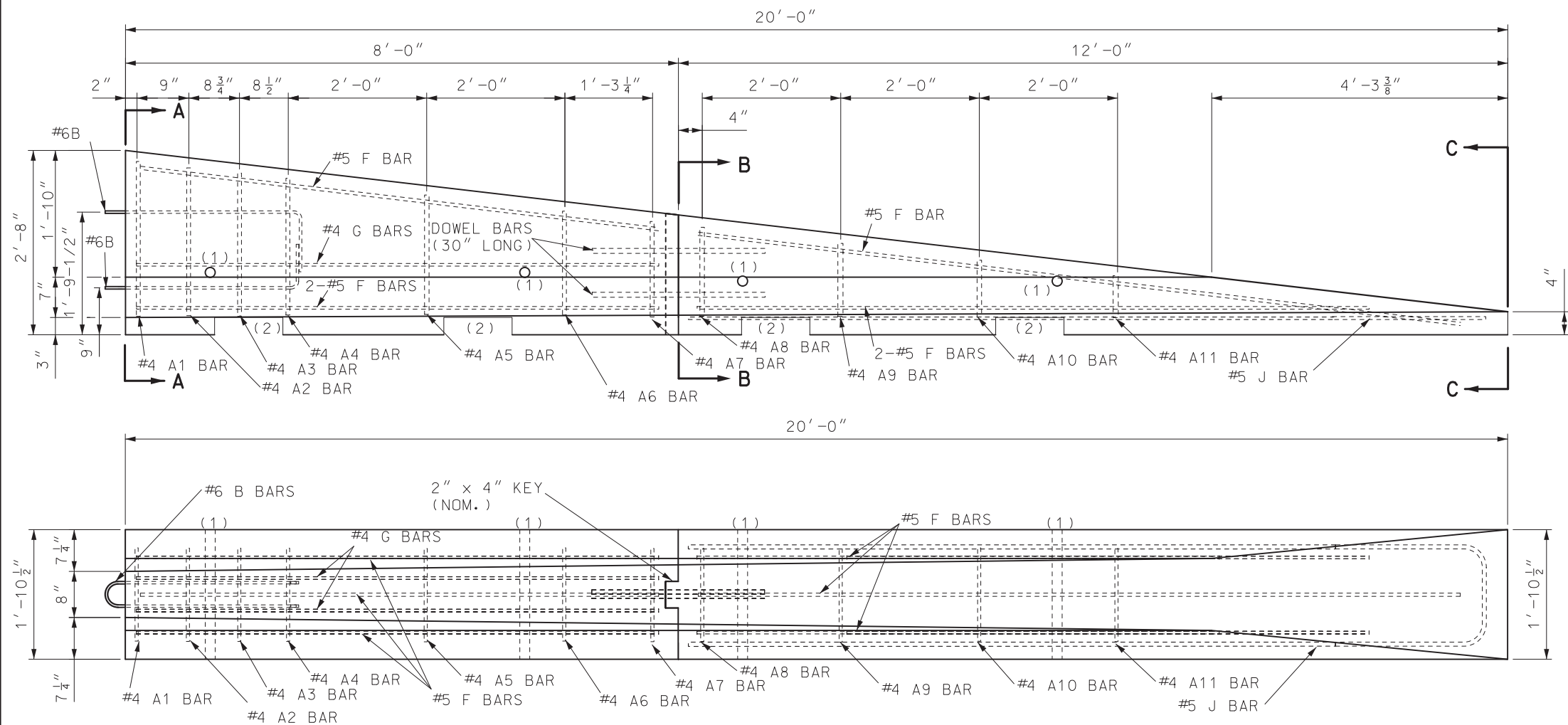
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

TEMPORARY CONCRETE TRAFFIC BARRIER
TYPE F

DATE EFFECTIVE: 10/01/2015
DATE PREPARED: 5/14/2018

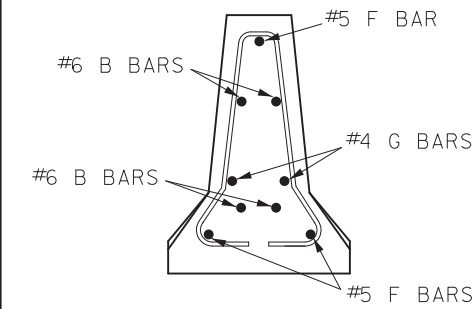
617.20E

SHEET NO.
2 OF 8

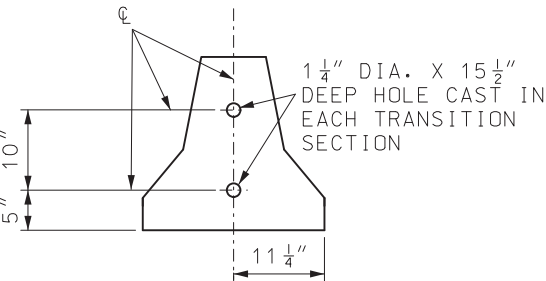


PRECAST BARRIER HEIGHT TRANSITION (TEMPORARY INSTALLATIONS ONLY)

- (1) OPTIONAL 4 INCH DIAMETER, 11 GAUGE STEEL ROUND MECHANICAL TUBING SLEEVE FOR LIFT HOLE ALLOWED. THE LOCATION OF THE HOLE MAY VARY TO ACCOMMODATE THE DIFFERING WEIGHT DISTRIBUTIONS OF TRANSITION SECTIONS.
- (2) 3" X 1'-0" SLOTS FOR LIFTING - TWO PER SECTION. LOCATION TO BE DETERMINED BY CONTRACTOR.

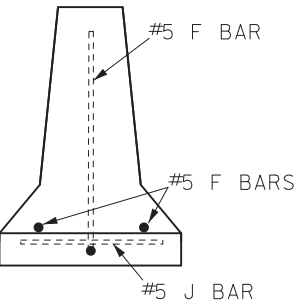


SECTION A-A

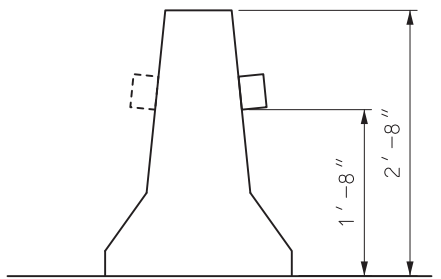


SECTION B-B

NOTE: SECTIONS TO BE CONNECTED WITH TWO- 1" DIA. BARS OR #8 REINFORCING BARS 30" LONG IN 1 1/4" DIA. HOLES AS SHOWN.

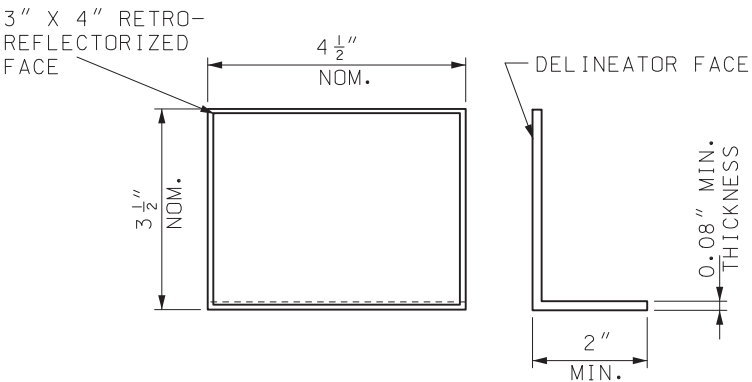


SECTION C-C



TRAFFIC BARRIER DELINEATORS

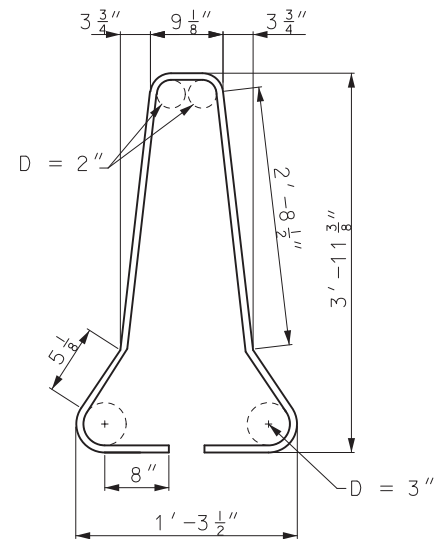
REFLECTIVE SHEETING APPLIED TO TRAFFIC BARRIER DELINEATORS SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.5.



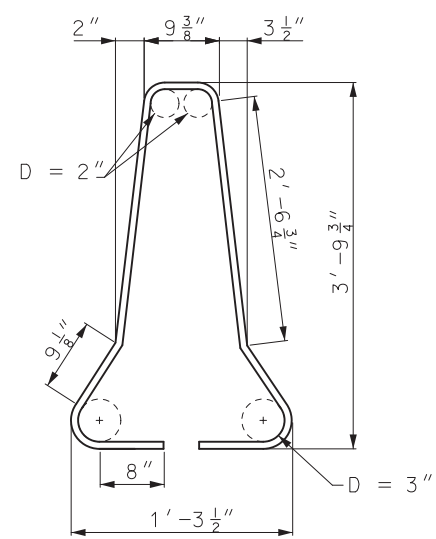
DEL INEATOR

- GENERAL NOTES:
- REINFORCING STEEL CLEARANCE TO EDGE OF CONCRETE SHALL BE 1 3/4" UNLESS OTHERWISE SHOWN.
 - HEIGHT TRANSITIONS SHALL NOT BE USED ON INTERSTATE ROUTES OR IN LOCATIONS WHERE THE POSTED SPEED PRIOR TO CONSTRUCTION IS GREATER THAN 35 MPH.
 - AT NO TIME SHALL THE BARRIERS BE LIFTED OR MOVED BY USE OF THE LOOP BARS.
 - RETAINER BOLT AND NUT MUST BE USED WITH TRANSITION BARRIER.
 - AT THE OPTION OF THE CONTRACTOR, HEIGHT TRANSITIONS MAY BE MANUFACTURED IN ONE SECTION. THE PLANS FOR REINFORCEMENT ACROSS JOINT SHALL BE APPROVED BY THE ENGINEER PRIOR TO MANUFACTURE.

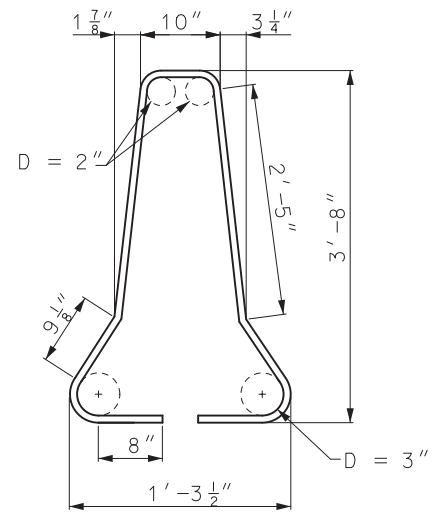
| | | |
|---|--|-----------------------|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | |
| <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY CONCRETE TRAFFIC BARRIER TYPE F HEIGHT TRANSITIONS</p> | |
| | <p>DATE EFFECTIVE: 07/01/2019 DATE PREPARED: 5/17/2019</p> | <p>617.20E</p> |



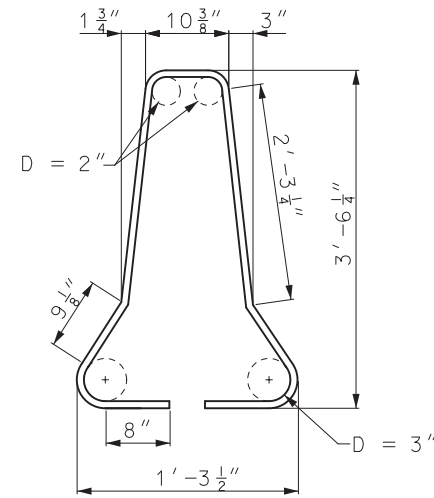
#4 A1 BAR



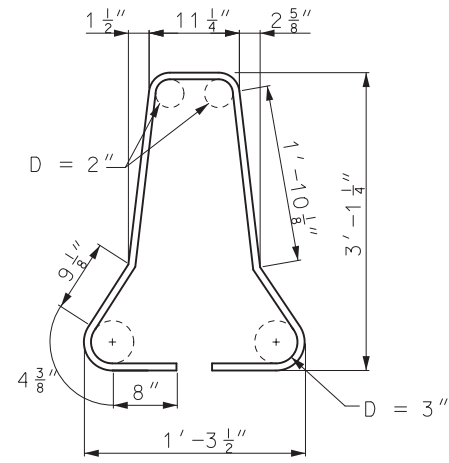
#4 A2 BAR



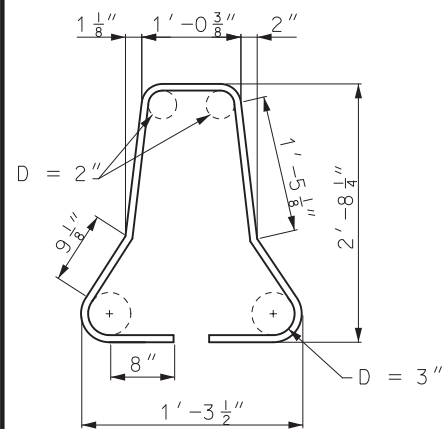
#4 A3 BAR



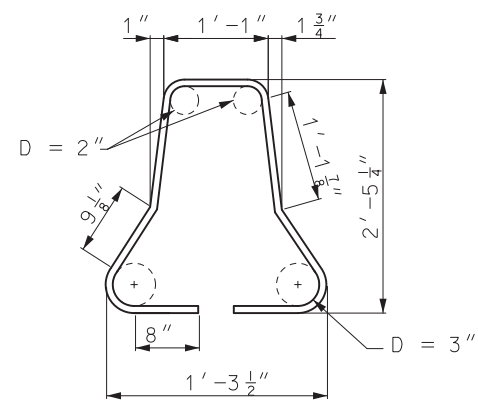
#4 A4 BAR



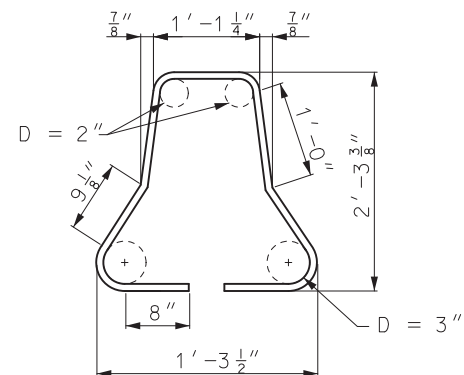
#4 A5 BAR



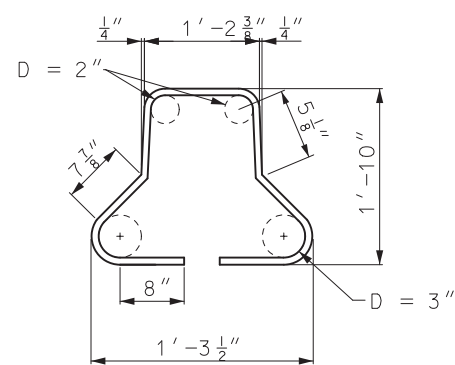
#4 A6 BAR



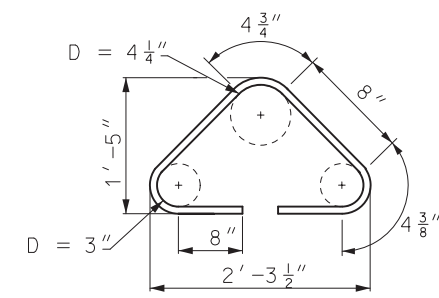
#4 A7 BAR



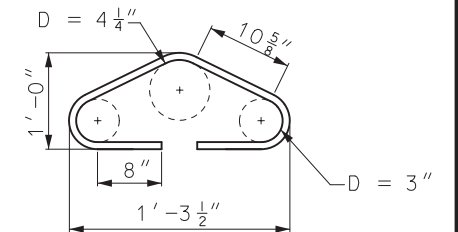
#4 A8 BAR



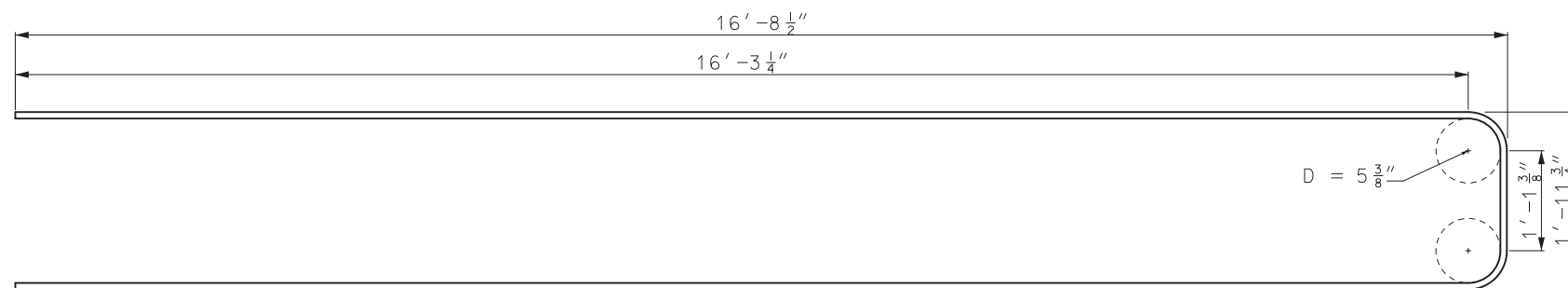
#4 A9 BAR



#4 A10 BAR



#4 A11 BAR





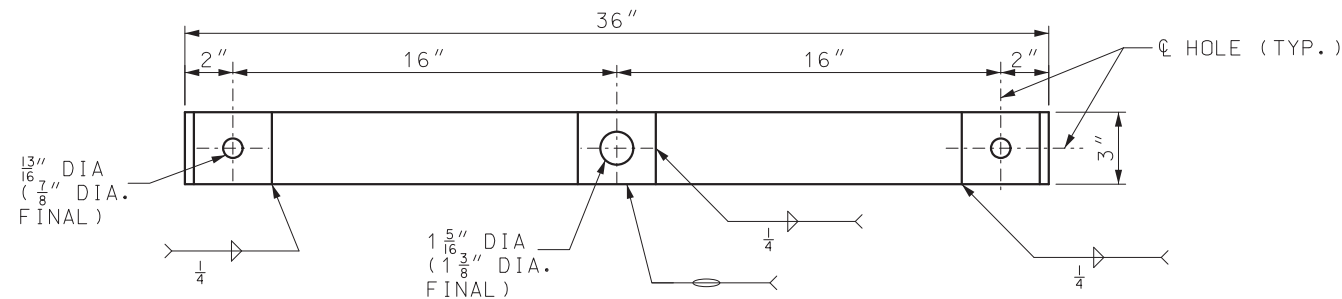
#5 J BAR

NOTE: FOR DETAILS OF B BARS, SEE SHEET 2 OF 6.

GENERAL NOTES:

DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE NOTED.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TEMPORARY CONCRETE TRAFFIC BARRIER TYPE F HEIGHT TRANSITIONS |
| DATE EFFECTIVE: 10/01/2015 DATE PREPARED: 5/14/2018 | 617.20E |
| SHEET NO. 4 OF 8 | |



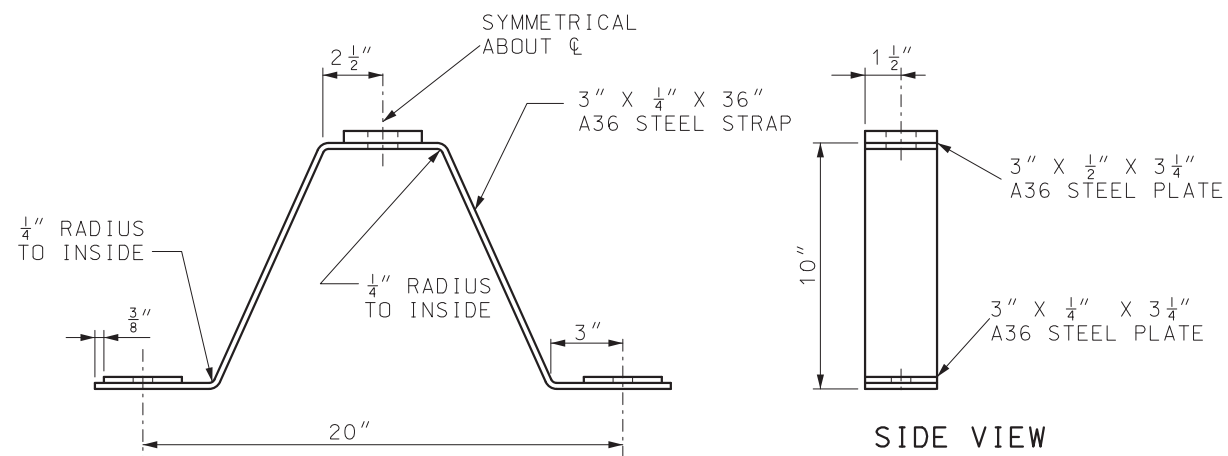
PLAN OF TIE-DOWN STRAP

(1) TIE-DOWN STRAP ANCHOR SHALL BE ONE OF THE FOLLOWING:

3/4" DROP IN ANCHOR WITH A 3 1/4" EMBEDMENT AND 3/4" DIA. X 1 3/4" LONG GRADE 5 BOLT.

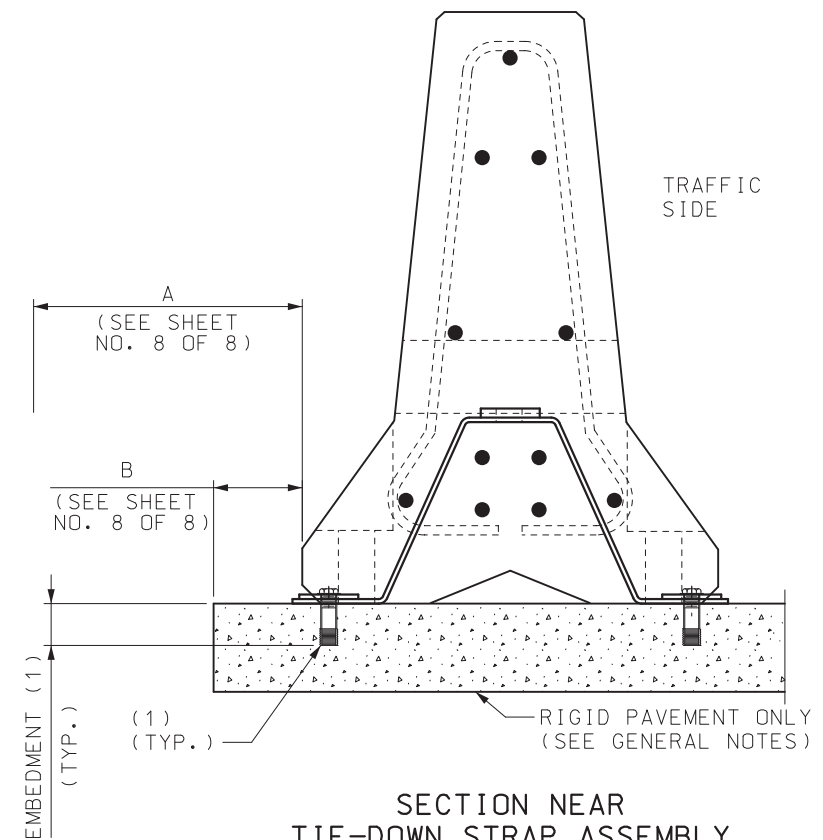
RED HEAD LARGE DIAMETER TAPCON (LDT) 3/4" X 4 1/2" LONG WITH A 4" EMBEDMENT.

SIMPSON TITEN HD 3/4" DIA. X 5" LONG WITH A 4 1/2" EMBEDMENT.

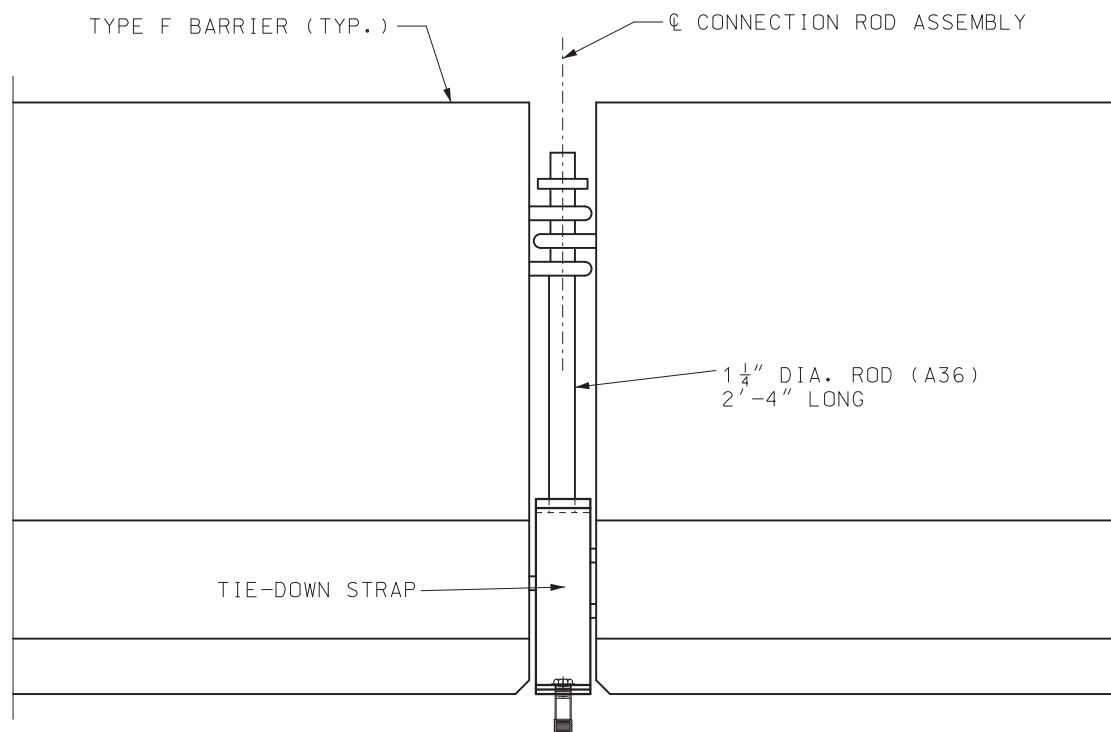


SIDE VIEW

DETAILS OF TYPE F TEMPORARY BARRIER TIE-DOWN STRAP

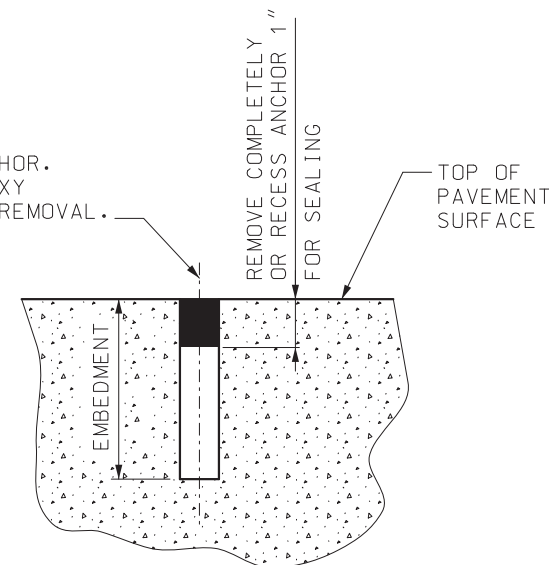


SECTION NEAR TIE-DOWN STRAP ASSEMBLY



PART ELEVATION OF BARRIER

3/4" DIA. ANCHOR. FILL WITH EPOXY MORTAR AFTER REMOVAL.



DETAIL SHOWING SEALING OF HOLES AFTER REMOVAL OF TIE-DOWN BOLTS

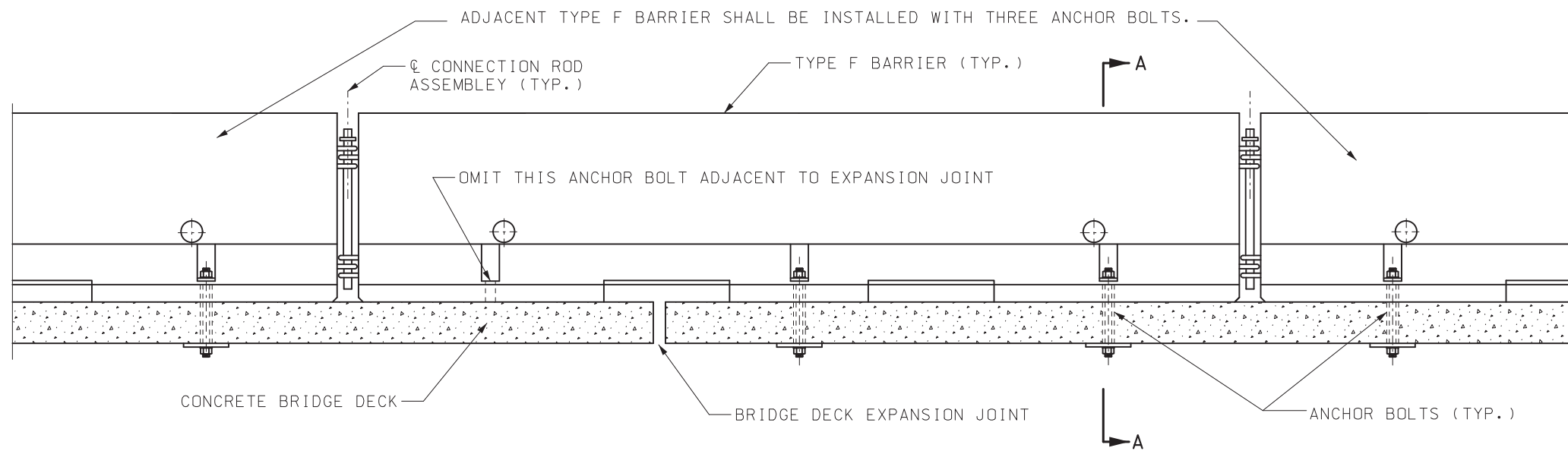
GENERAL NOTES:

TIE-DOWN STRAP SYSTEMS ARE ONLY APPLICABLE ON RIGID PAVEMENTS.

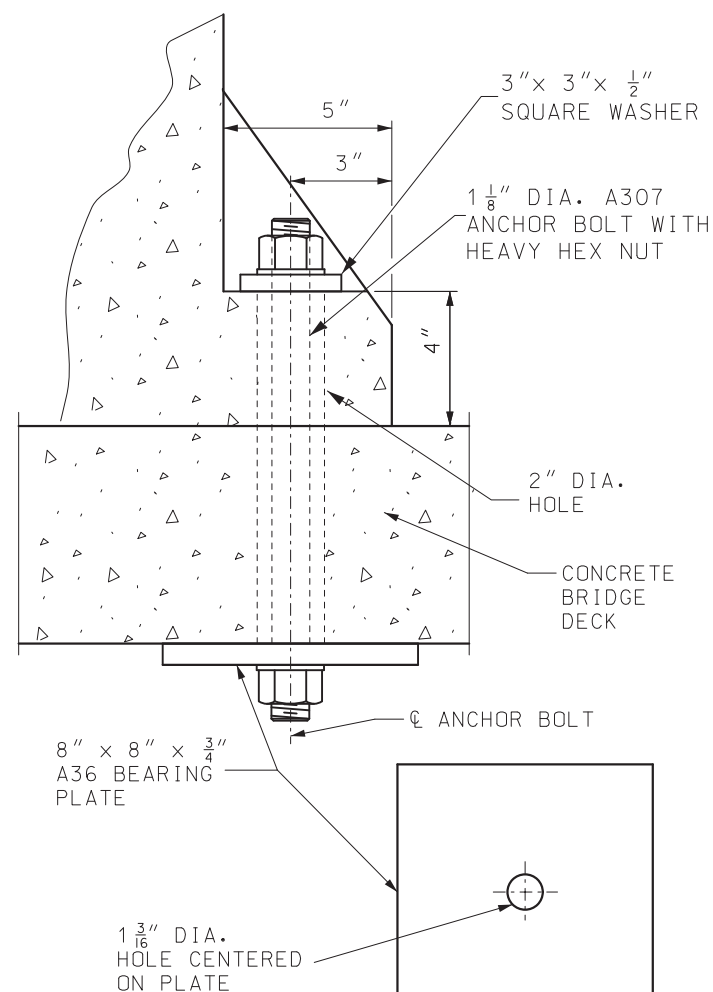
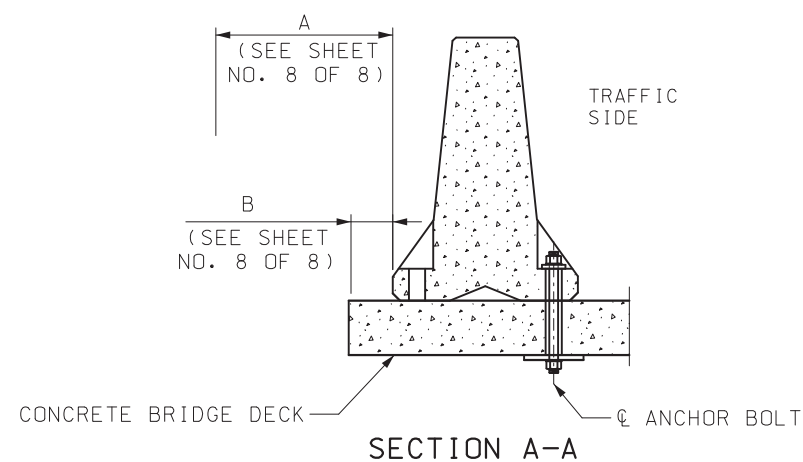
CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

| | |
|---|--|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI</p> <p>ERIC E. SCHROETER</p> <p>NUMBER PE-28411</p> <p>PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY CONCRETE TRAFFIC BARRIER</p> <p>ANCHORED (TIE-DOWN STRAP SYSTEM)</p> |
| <p>DATE EFFECTIVE: 07/01/2018</p> <p>DATE PREPARED: 5/3/2018</p> | <p>617.20E</p> |
| <p>SHEET NO. 5 OF 8</p> | |



BOLT THROUGH DECK AT THERMAL EXPANSION JOINTS



BOLT THROUGH DECK DETAIL



GENERAL NOTES:

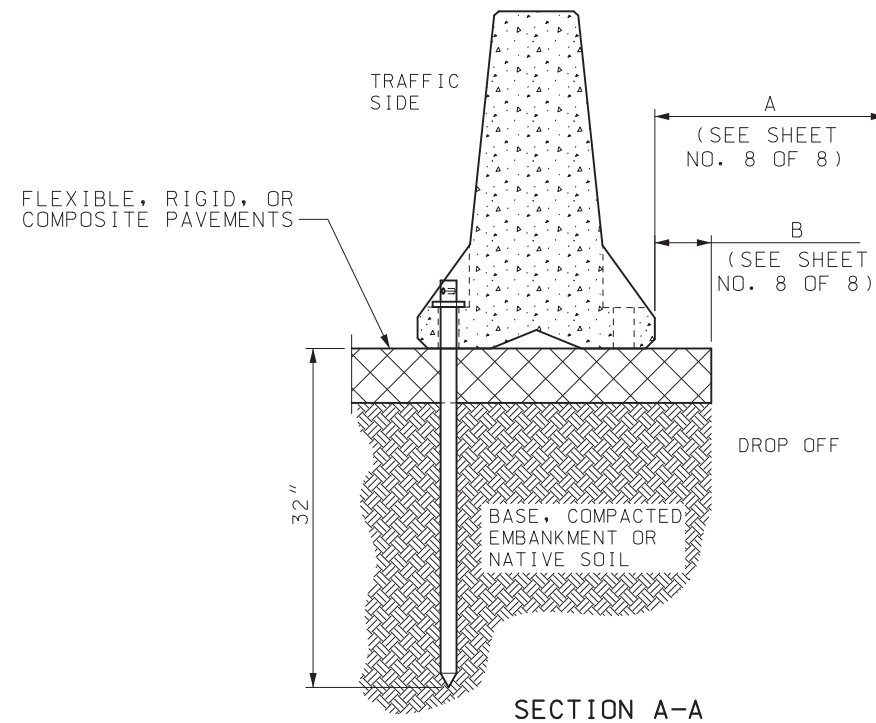
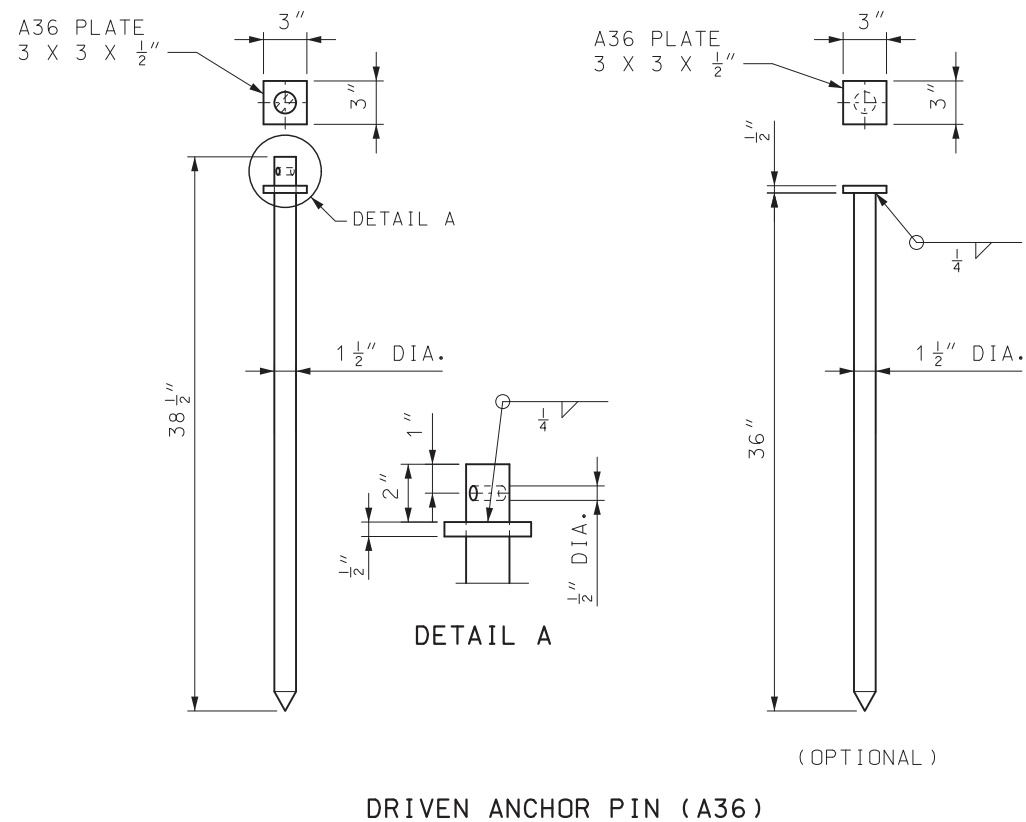
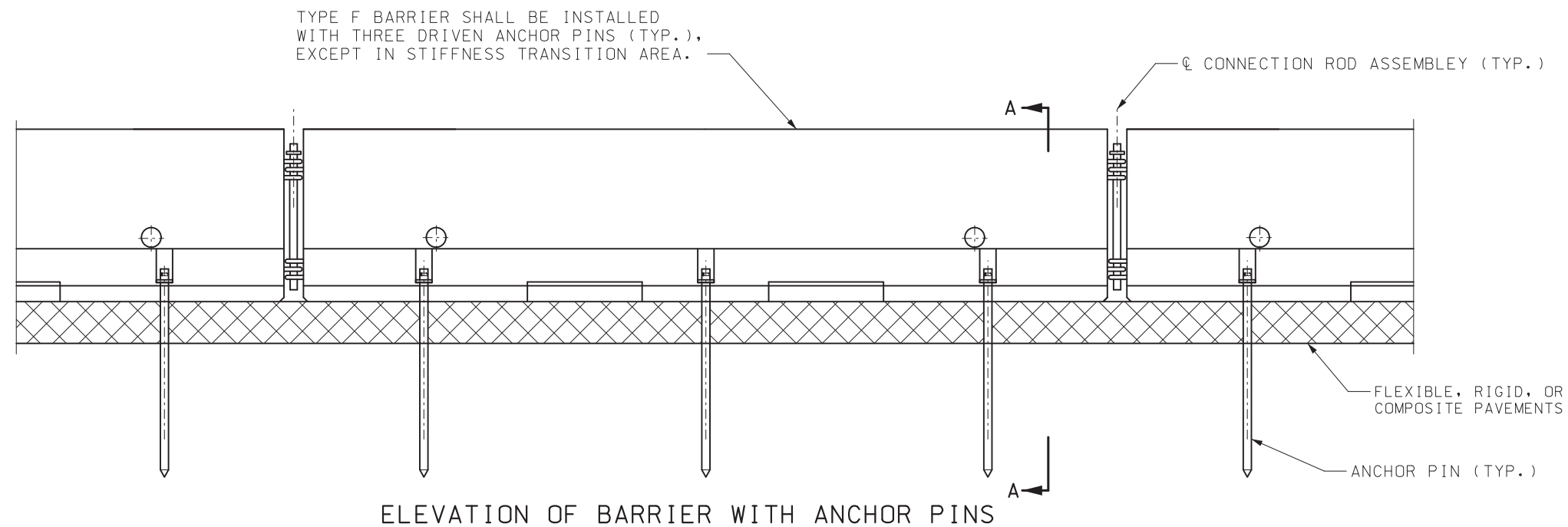
ANCHOR BOLT SYSTEMS ARE ONLY APPLICABLE ON BRIDGE DECKS AND RIGID PAVEMENTS.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR BOLTS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TEMPORARY CONCRETE TRAFFIC BARRIER ANCHORED (BOLT SYSTEM) |
| DATE EFFECTIVE: 10/01/2015 DATE PREPARED: 5/14/2018 | 617.20E |
| SHEET NO. 6 OF 8 | |



GENERAL NOTES:


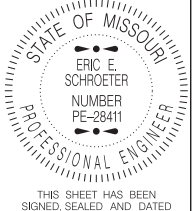
CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

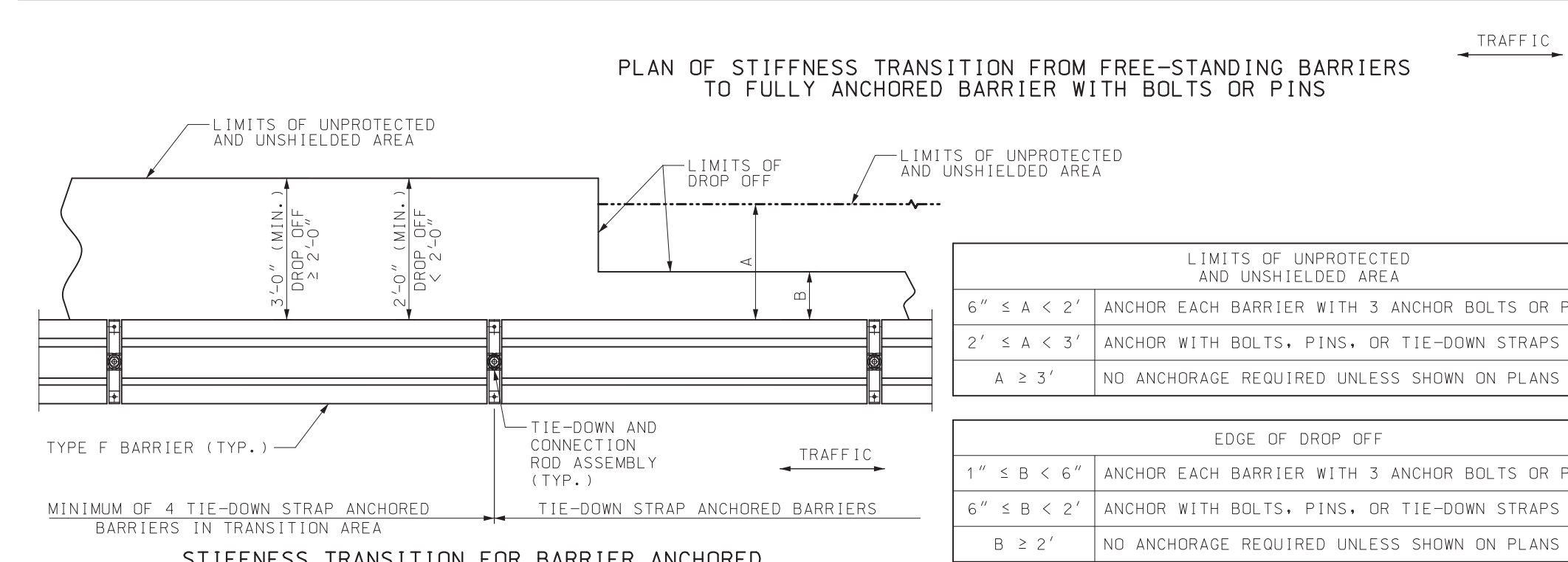
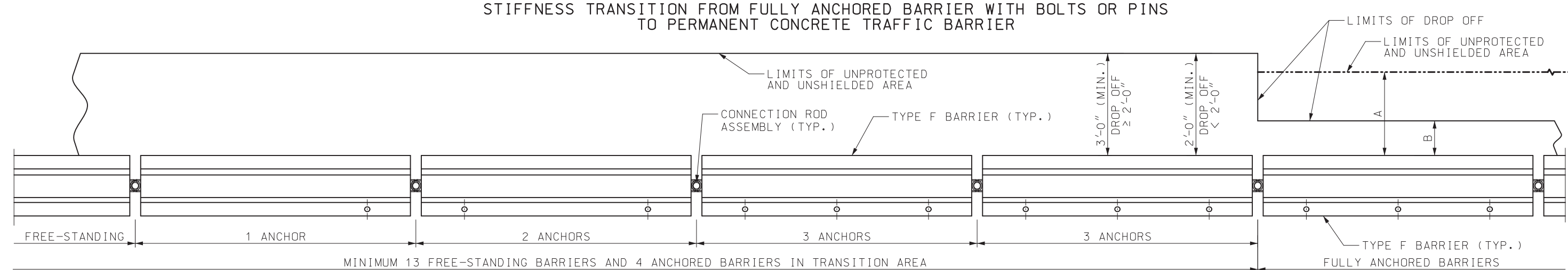
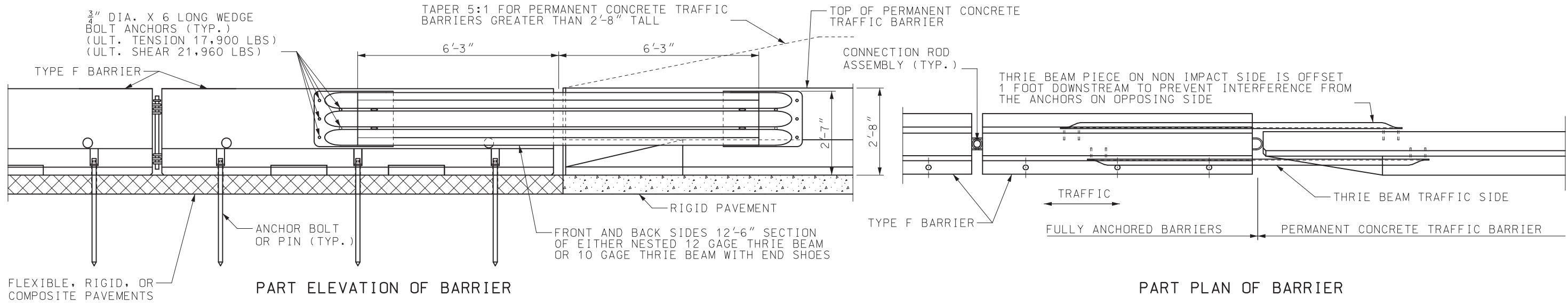
WHERE EXISTING FLEXIBLE PAVEMENT OR RIGID PAVEMENT IS NOT PRESENT A 2" THICK X 30" WIDE MINIMUM ASPHALT PAD SHALL BE CONSTRUCTED.

COST OF FURNISHING AND INSTALLING THE ASPHALT PAD COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.

AFTER REMOVAL OF ANCHOR PINS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TEMPORARY CONCRETE TRAFFIC BARRIER ANCHORED (PIN SYSTEM) |
| DATE EFFECTIVE: 07/01/2018 DATE PREPARED: 5/3/2018 | 617.20E |
| SHEET NO. 7 OF 8 | |



STIFFNESS TRANSITION FOR BARRIER ANCHORED WITH TIE-DOWN STRAPS
(13 FREE-STANDING BARRIERS NOT REQUIRED)

| LIMITS OF UNPROTECTED AND UNSHIELDED AREA | |
|---|---|
| $6'' \leq A < 2'$ | ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS |
| $2' \leq A < 3'$ | ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS |
| $A \geq 3'$ | NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS |

| EDGE OF DROP OFF | |
|--------------------|---|
| $1'' \leq B < 6''$ | ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS |
| $6'' \leq B < 2'$ | ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS |
| $B \geq 2'$ | NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS |

NOTE: TEMPORARY CONCRETE TRAFFIC BARRIER MUST MEET BOTH A AND B DIMENSIONS, UNLESS OTHERWISE SHOWN ON PLANS.


GENERAL NOTES:
CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN FIELD BEFORE ORDERING NEW MATERIAL.

COST OF FURNISHING AND INSTALLING THE ANCHOR BOLT SYSTEM, ANCHOR PINS SYSTEM, TIE-DOWN STRAP SYSTEM AND THRIE BEAM COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

ALL TYPE F BARRIERS SHALL BE CONNECTED TO ADJACENT TYPE F BARRIERS WITH CONNECTION ROD ASSEMBLY, AND PULLED TIGHT DURING INSTALLATION TO REMOVE SLACK TO PROVIDE LONGITUDINAL TENSION DURING IMPACT.

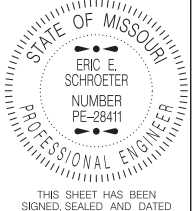
AFTER REMOVAL OF ANCHORS HOLES SHALL BE FILLED WITH QUALIFIED SPECIAL MORTAR IN ACCORDANCE WITH SEC 704.

SEE OTHER SHEETS FOR DETAILS NOT SHOWN.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



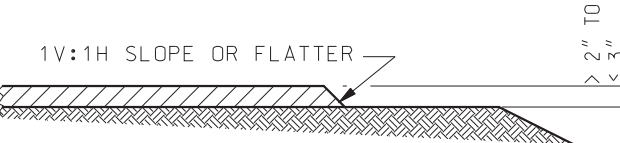



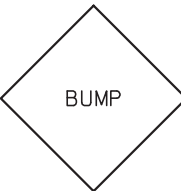
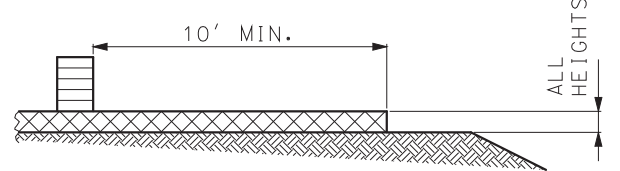
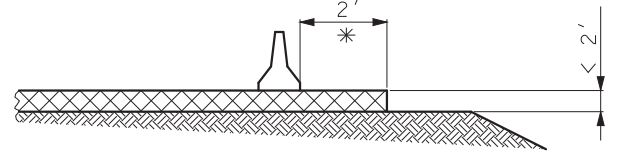
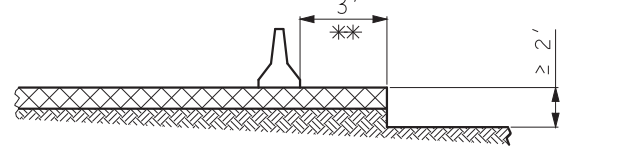
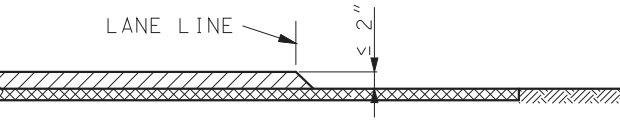


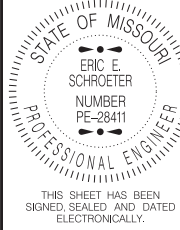
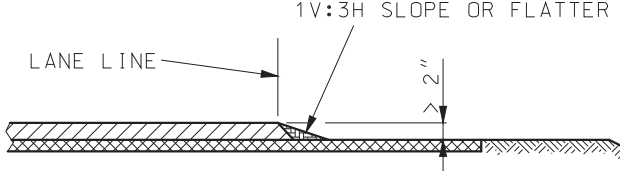
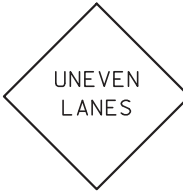
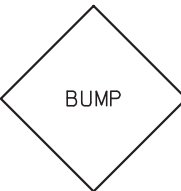
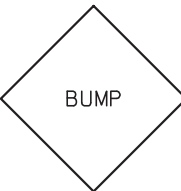

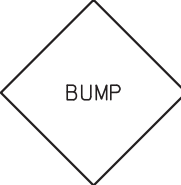


TEMPORARY CONCRETE TRAFFIC BARRIER STIFFNESS TRANSITION

| | |
|-----------------|------------|
| DATE EFFECTIVE: | 07/01/2018 |
| DATE PREPARED: | 5/3/2018 |

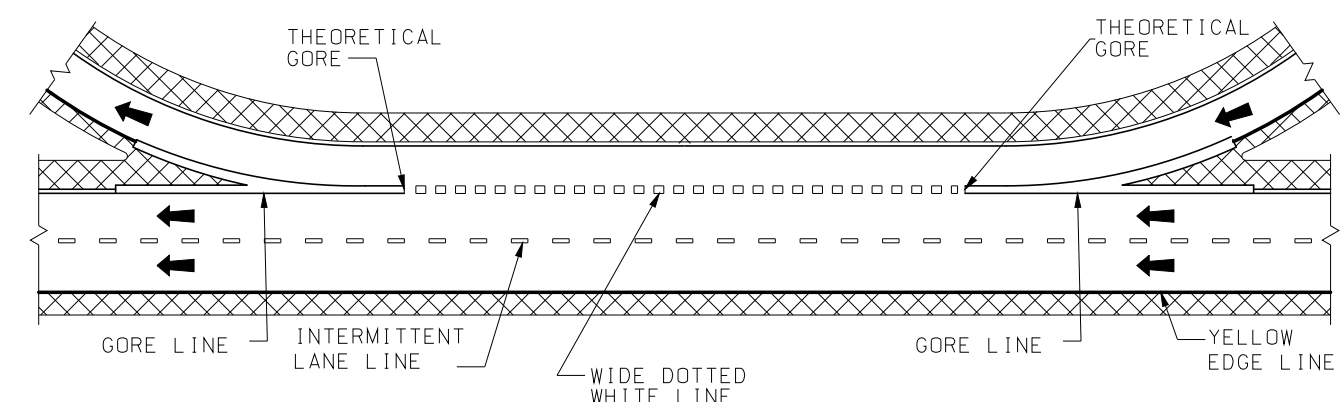
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| 617.20E | SHEET NO. 8 OF 8 |
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IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

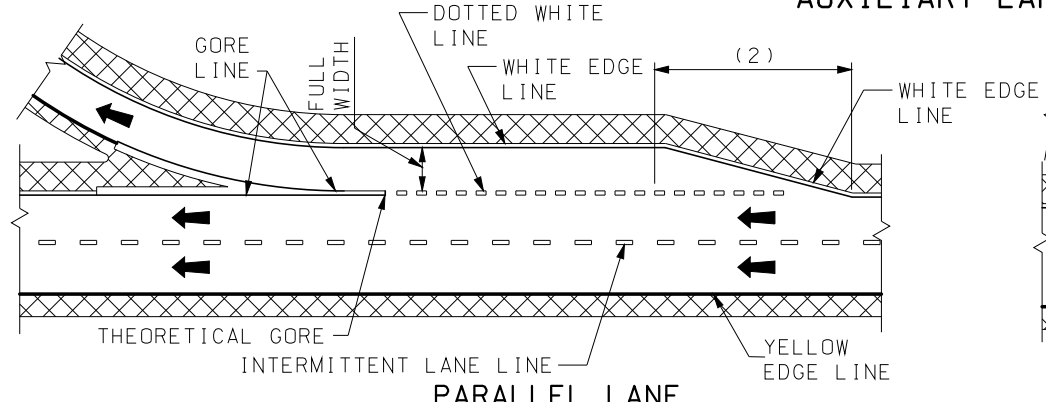
| CROSS SECTION | | CONDITION | | TREATMENT | SIGN | | | |
|-------------------|---|---|---|--|---|--|---|--|
| | | DIFFERENTIAL | TIME | | MAINLINE (1) | SIDE ROAD (2) | | |
| EDGE DROP-OFF |  | PAVEMENT EDGE DIFFERENTIAL > 2" TO ≤ 3" | NON-WORKING HOURS | WEDGE SLOPE TO 1V:1H OR FLATTER |  W08-17 (3)(4) W08-17p (6) | NO SIGNS REQUIRED | <div>(1) SIGNS SHALL BE SPACED AT APPROXIMATELY ONE MILE INTERVALS AND LOCATED WITHIN 150 FT. BEYOND ANY STATE ROADS. WHEN A SIGN PLACED AT THE ONE MILE INTERVAL FALLS WITHIN 1/2 MILE OF A SIGN PLACED AFTER AN INTERSECTION, THE SIGN PLACED AT THE 1/2 MILE INTERVAL MAY BE OMITTED. WHEN SHOULDER DROP-OFF SIGNS WITH UNEVEN LANES ARE BOTH SPECIFIED, ALTERNATING SIGN MESSAGES SHALL BE USED AT 1 MILE SPACINGS.</div> <div>(2) ON SIDE ROADS WITH POSTED SPEED OF 45 MPH OR GREATER, SIGNS SHALL BE PLACED 150 FT. IN ADVANCE OF INTERSECTION WITH MAINLINE.</div> <div>(3) SIGNS SHALL BE LOCATED ON THE SIDE OF THE ROADWAY WHERE THE PAVEMENT EDGE DIFFERENTIAL EXISTS.</div> <div>(4) SIGNS TO REMAIN VISIBLE UNTIL SHOULDER SHAPING IS COMPLETE.</div> <div>(5) SIGNS SHALL BE LOCATED ON RIGHT SIDE OF NON-DIVIDED HIGHWAYS AND ON BOTH SIDES OF DIVIDED HIGHWAYS WHERE A LANE LINE DIFFERENTIAL EXISTS.</div> <div>(6) WHEN THE SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.</div> <div>LEGEND</div> <div><div> - RIGID PAVEMENT</div><div> - FLEXIBLE PAVEMENT</div><div> - ALL PAVEMENT TYPES</div></div> <div>GENERAL NOTES:</div> <div>SIGNS SHALL BE VISIBLE TO TRAFFIC ONLY WHEN AND WHERE CONDITIONS EXIST.</div> <div>FOR ADDITIONAL SIGN SPACING AND DETAILS SEE STANDARD PLAN 620.10.</div> | |
| |  | | WORKING HOURS | NO EDGE TREATMENT REQUIRED | | | | |
| |  | PAVEMENT EDGE DIFFERENTIAL > 3" | NON-WORKING HOURS | WEDGE SLOPE TO 1V:3H OR FLATTER |  W08-17 (3)(4) W08-17p (6) |  W08-1 (3) | | |
| |  | | WORKING HOURS | DELINEATE DIFFERENTIAL WITH CHANNELIZERS | | | | |
| |   * FOR DISTANCES LESS THAN 2', SEE STANDARD PLAN 617.20.  ** FOR DISTANCES LESS THAN 3', SEE STANDARD PLAN 617.20. | ANY PAVEMENT EDGE OR LANE LINE DIFFERENTIAL | NON-WORKING AND WORKING HOURS WHERE PLANS REQUIRE ADJACENT LANE CLOSURE WITH CHANNELIZATION OR PARTIAL LANE CLOSURE WITH BARRIER. | NO EDGE TREATMENT REQUIRED | NO SIGNS REQUIRED | NO SIGNS REQUIRED | | |
| | | | | | | | | |
| LANE DIFFERENTIAL |  | LANE LINE DIFFERENTIAL ≤ 2" | NON-WORKING AND WORKING HOURS | NO EDGE TREATMENT REQUIRED |  W08-11 (5) | NO SIGNS REQUIRED | <div><div>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION<div>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</div></div><div><div>PAVEMENT EDGE TREATMENT</div><div><div>DATE EFFECTIVE: 10/01/2017 DATE PREPARED: 8/8/2017</div><div>619.10J</div><div>SHEET NO. 1 OF 1</div></div></div></div> | |
| |  | LANE LINE DIFFERENTIAL > 2" | NON-WORKING AND WORKING HOURS WHERE LANES OPEN TO TRAFFIC | WEDGE SLOPE TO 1V:3H OR FLATTER |  W08-11 (5) |  W08-1 | | |
| | | | NON-WORKING AND WORKING HOURS WHERE LANE CLOSED TO TRAFFIC | DELINEATE DIFFERENTIAL WITH CHANNELIZERS | | | | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

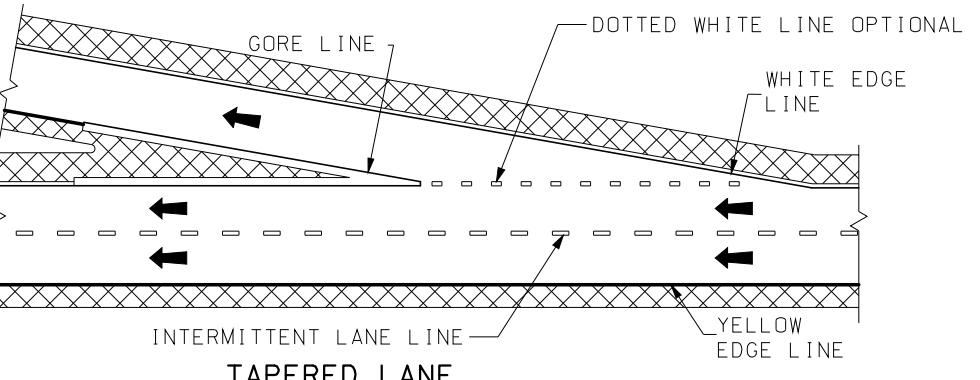
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



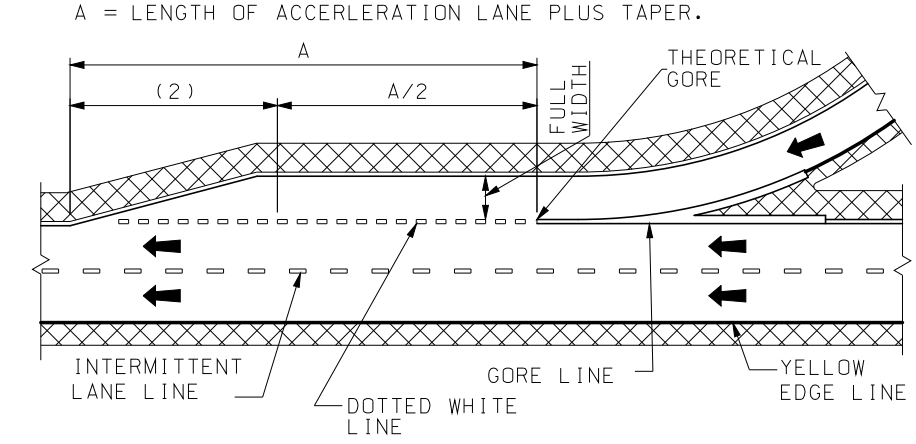
AUXILIARY LANE MARKING



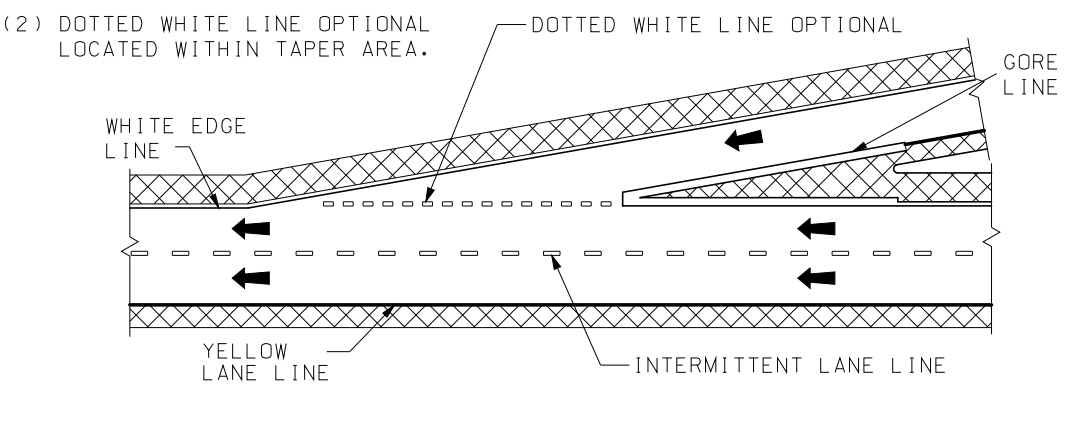
PARALLEL LANE



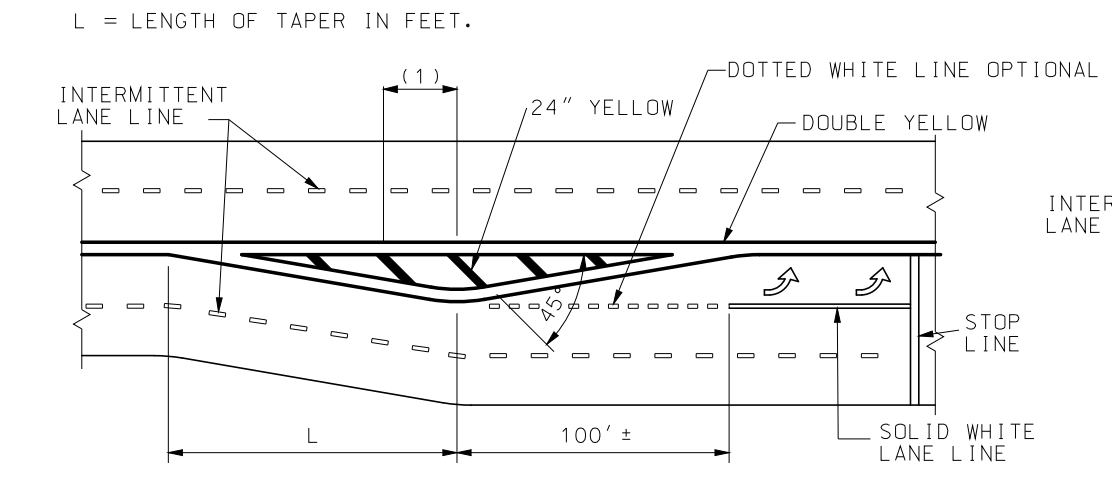
TAPERED LANE



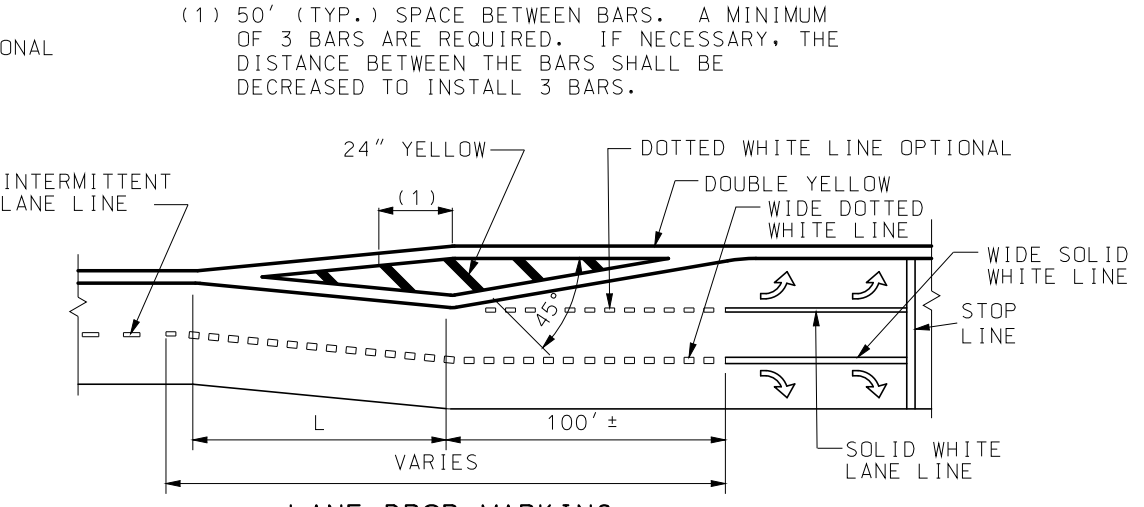
PARALLEL LANE



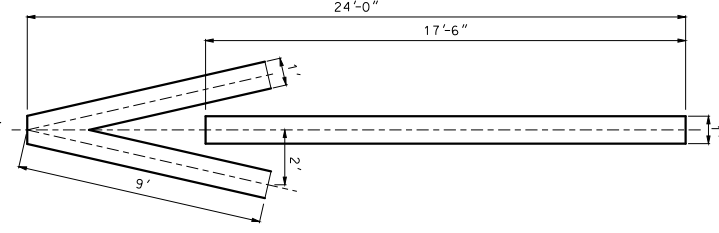
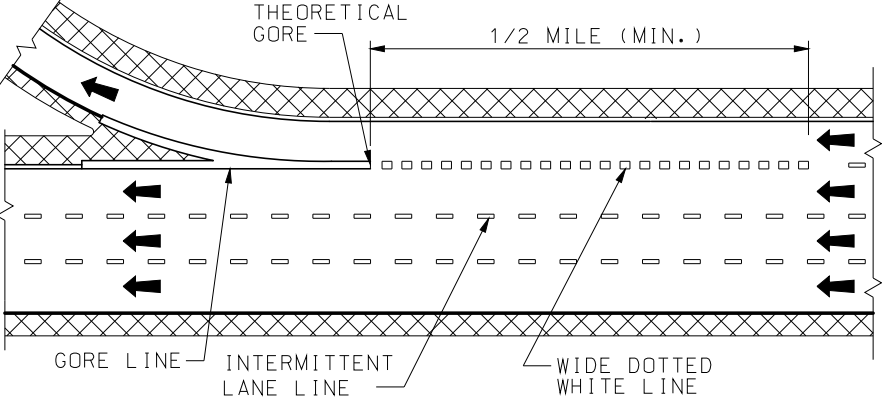
ENTRANCE RAMP MARKING



MEDIAN ISLAND MARKING



LANE DROP MARKING



OFF RAMP WRONG WAY ARROW

GENERAL NOTES:

DOTTED LINES SHALL BE 3 FEET IN LENGTH SEPARATED BY 9 FOOT GAPS.

REFER TO THE STANDARD PLAN 626.00 WHEN INSTALLING PAVEMENT MARKINGS OVER RUMBLE STRIPS.

WIDE LINES ARE TWICE THE WIDTH OF NORMAL LINES.

LANE LINES SHALL BE AN INTERMITTENT OR SOLID WHITE.

INTERMITTENT LINES SHALL BE 10 FEET IN LENGTH SEPARATED BY 30 FOOT GAPS.

EDGELINES SHALL BE CONTINUOUS SOLID WHITE OR YELLOW LINES. RIGHT SIDE EDGELINES SHALL BE SOLID WHITE. MEDIAN OR LEFT SIDE EDGELINES ON DIVIDED HIGHWAYS AND ON THE LEFT SIDE OF RAMPS SHALL BE SOLID YELLOW. EDGELINES SHALL BE CONTINUOUS ACROSS DRIVEWAYS AND MINOR INTERSECTING ROADS.

"NO PASSING" LINES SHALL BE CONTINUOUS SOLID YELLOW.

"NO PASSING" LINES SHALL BE PLACED AS SHOWN IN "LINE DETAIL". "NO PASSING" LINES ON A TWO-LANE, TWO-WAY HIGHWAY WHEN PASSING IS PROHIBITED IN EACH DIRECTION SHALL BE PLACED 4 INCHES APART AND THE INTERMITTENT CENTERLINE SHALL BE OMITTED.

STOP LINES SHALL BE A SOLID WHITE TRANSVERSE LINE 24 INCHES WIDE, LOCATED AT LEAST 4 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY.

CROSSWALK LINES SHALL BE SOLID WHITE TRANSVERSE LINES 6 INCHES WIDE AT LEAST 6 FEET APART. CROSSWALK LINES ON THE INTERSECTION SIDE OF THE CROSSWALK SHALL MEET AT THE CURB.

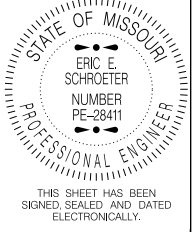
GORE LINES SHALL BE A SOLID WHITE LINE WITH A WIDTH TWICE THAT OF THE EDGELINE.

ARROWS AND WORD SYMBOLS SHALL BE SOLID WHITE.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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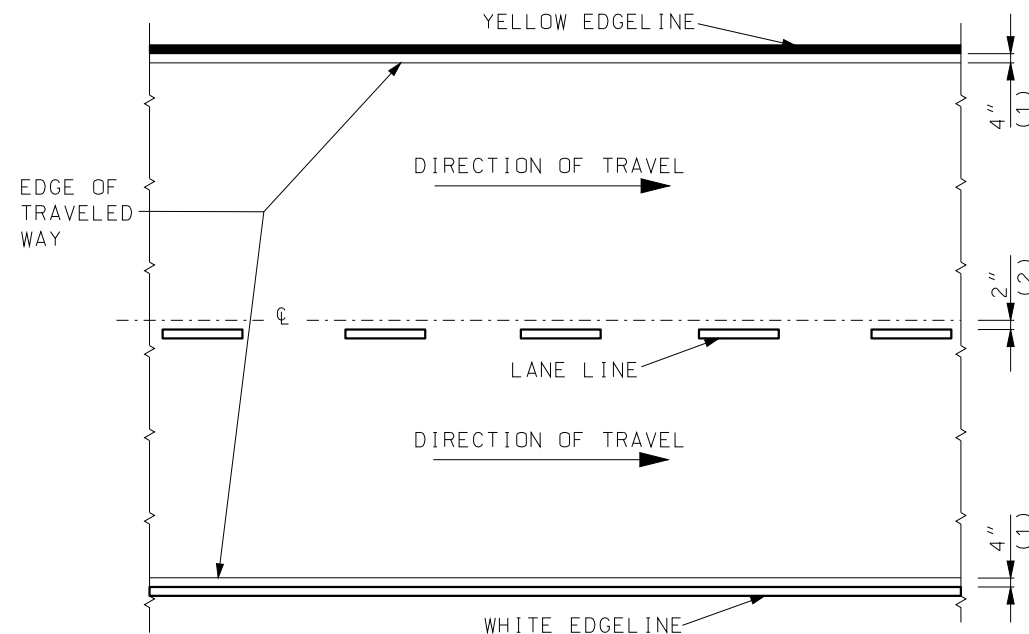


PAVEMENT MARKING

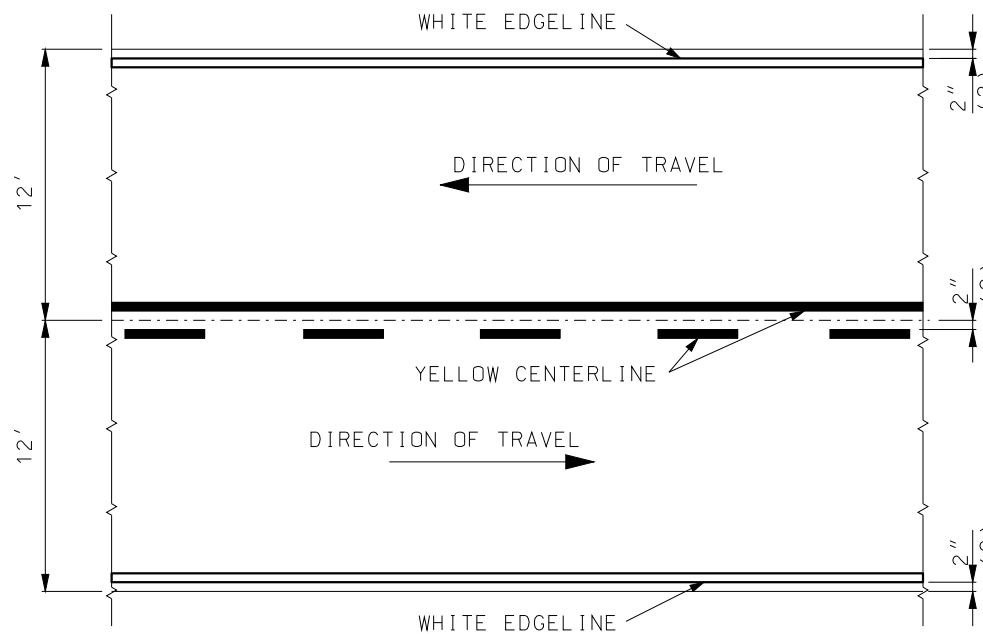
DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/17/2016

620.00L

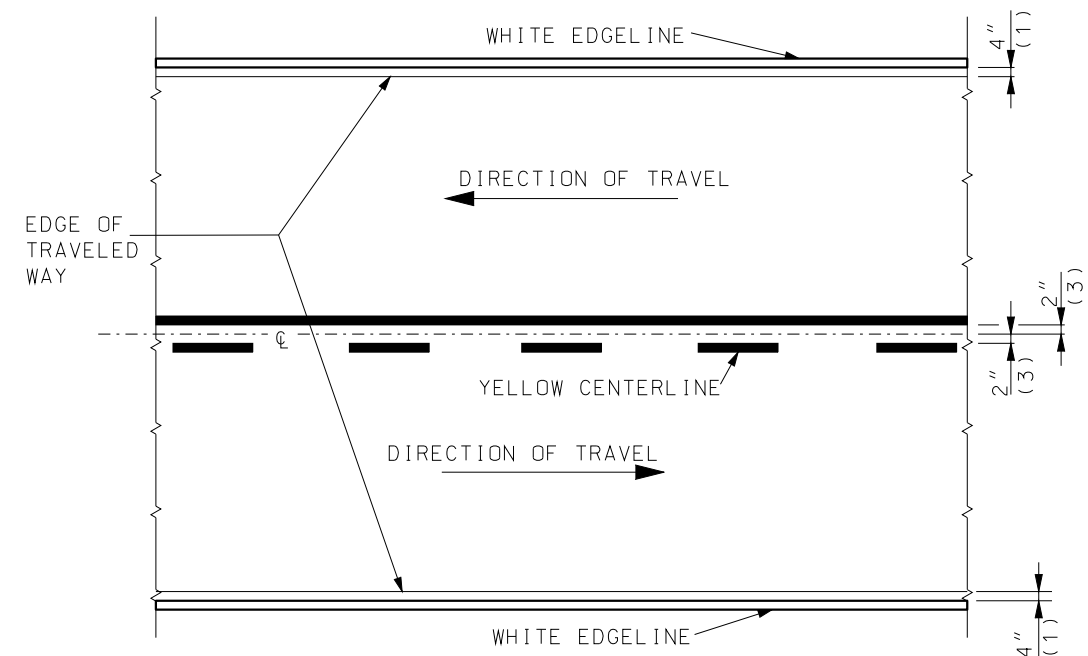
SHEET NO.
1 OF 5



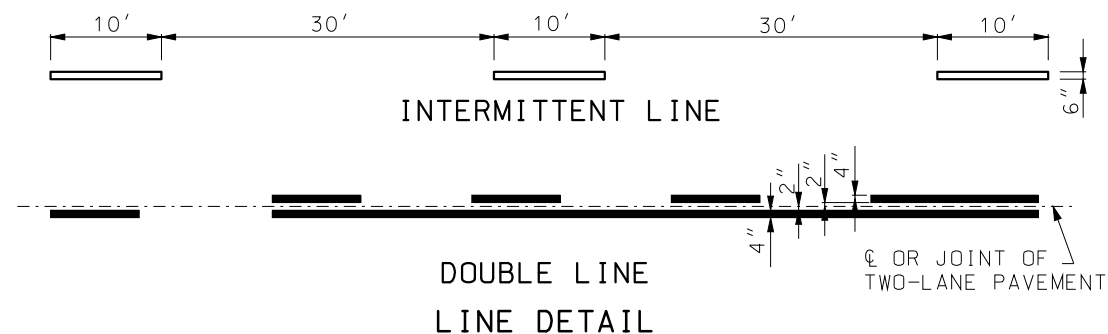
DIVIDED PAVEMENT



TWO-LANE TWO-WAY
TYPICAL STRIPING OFFSETS
WITHOUT RUMBLE STRIPES




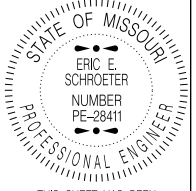
TWO-LANE TWO-WAY
TYPICAL STRIPING OFFSETS
FOR RUMBLE STRIPES

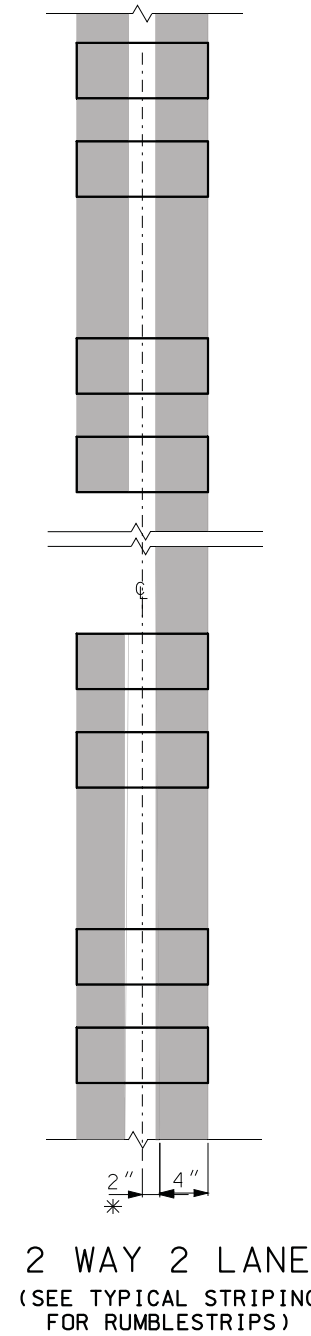
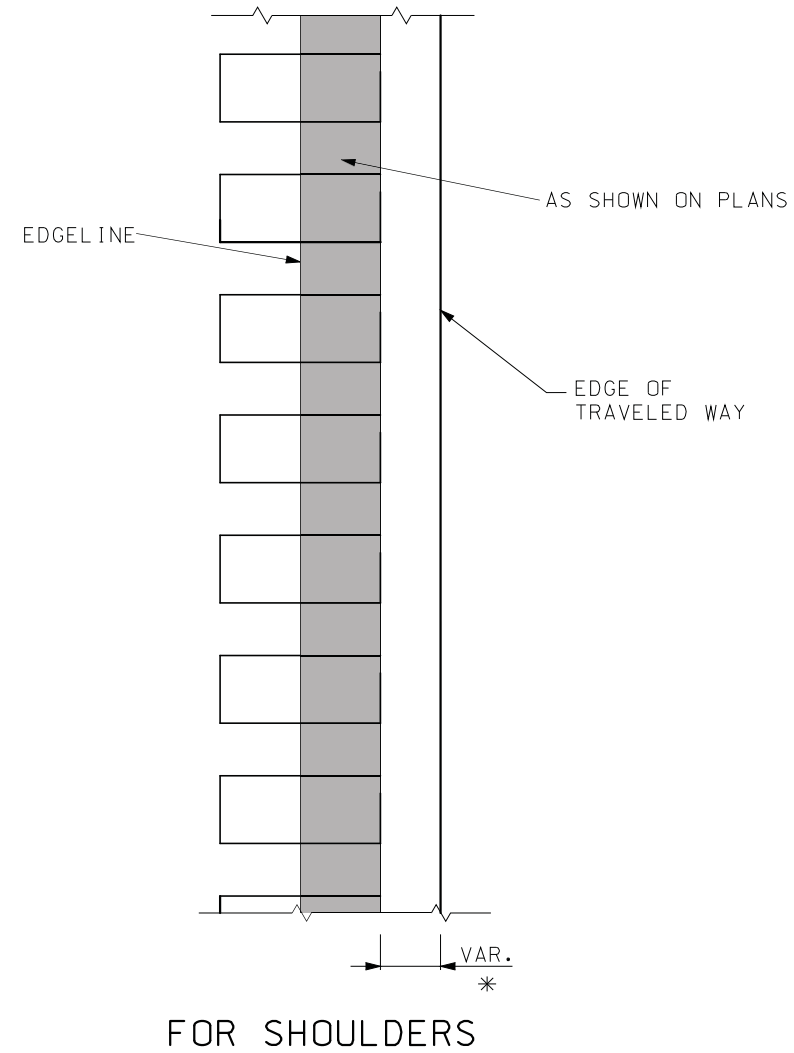


DOUBLE LINE
LINE DETAIL


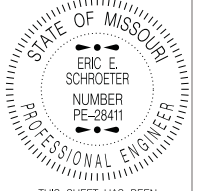


- (1) OFFSET FROM EDGE OF TRAVELED WAY (TYP.)
- (2) OFFSET FROM JOINT (TYP.)
- (3) OFFSET FROM CENTERLINE (TYP.)

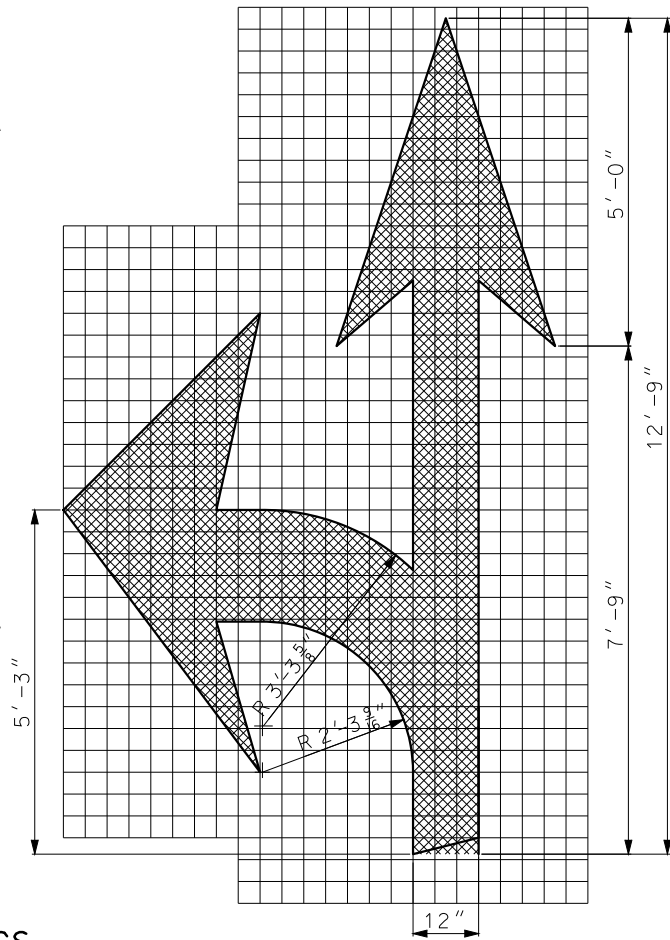
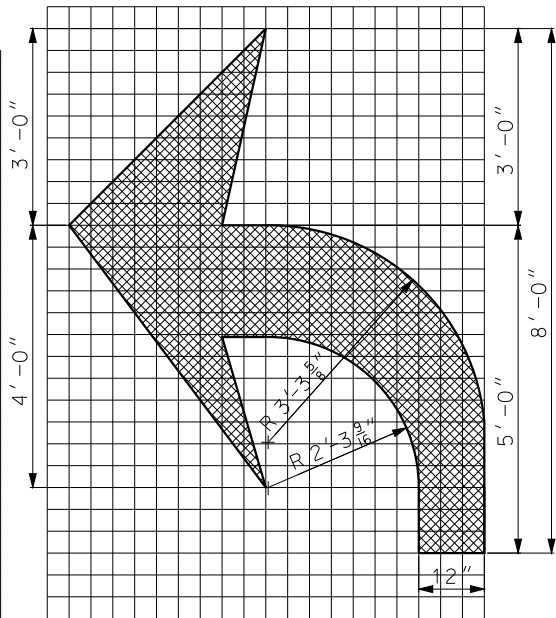
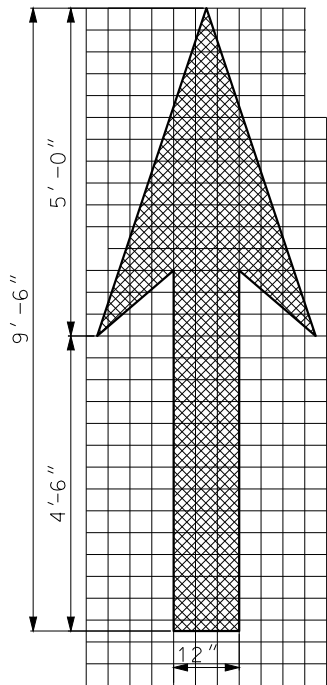
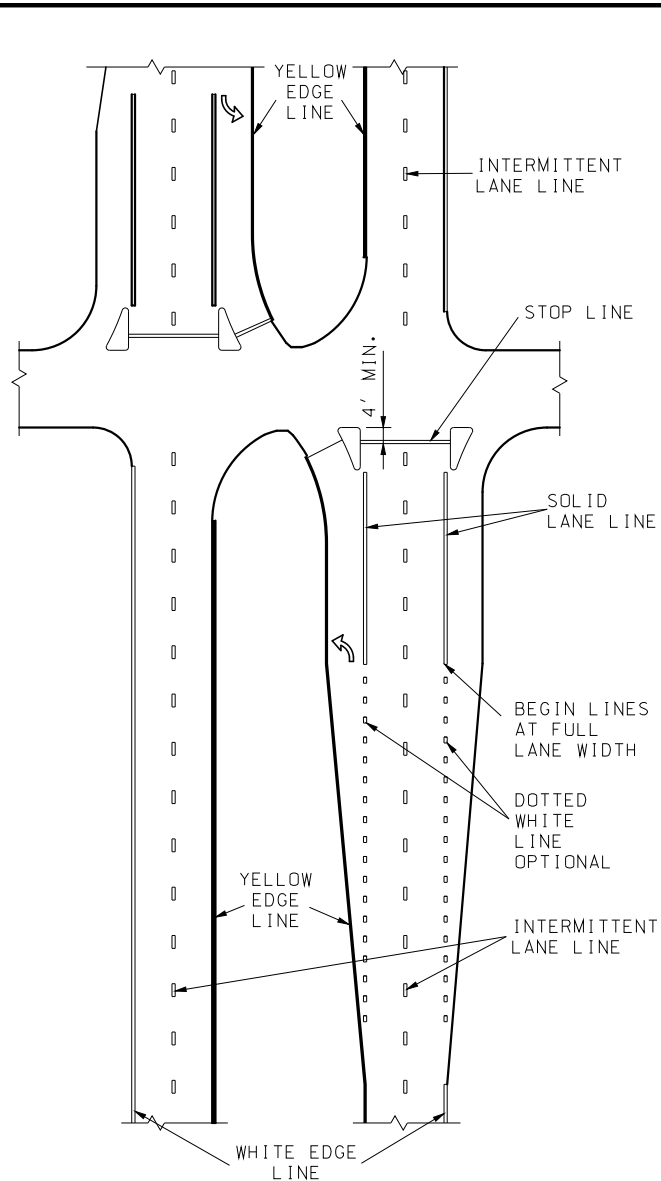
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|--|-------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PAVEMENT MARKING |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/17/2016 | SHEET NO. 2 OF 5 |



* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

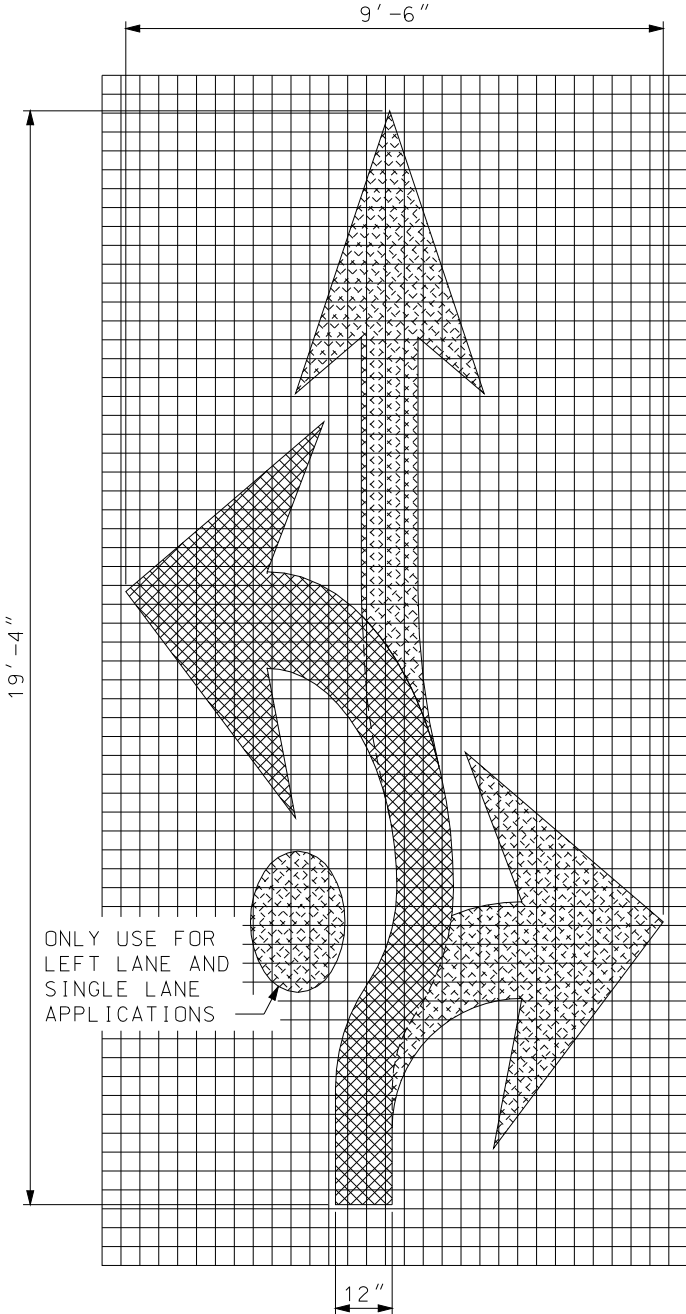
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PAVEMENT MARKING STRIPING THROUGH RUMBLE STRIPS</p> |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/17/2016 | 620.00L |
| SHEET NO. 3 OF 5 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



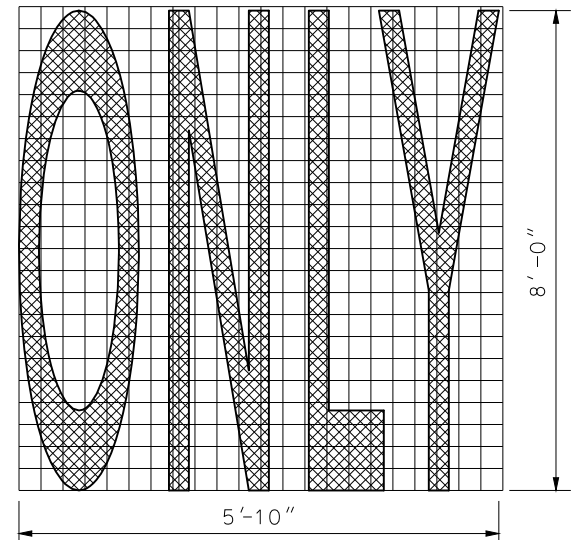
ARROW MARKINGS

TWO LANE USE CONTROL ARROWS FOR FIRST 200 FEET WITH ONE ADDITIONAL ARROW EVERY 400 FEET OF MANDATORY MOVEMENT LANE. FIRST ARROW 75 FEET FROM STOP LINE.

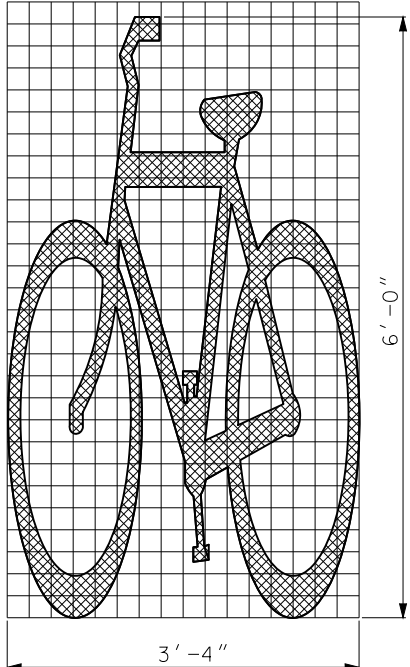


FISH-HOOK ARROW ROUNDBOUT APPROACH MARKINGS

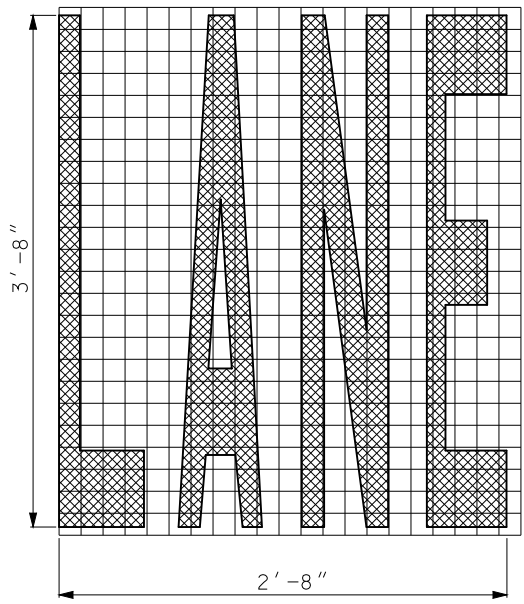
SIGNALIZED GRADE INTERSECTION MARKING



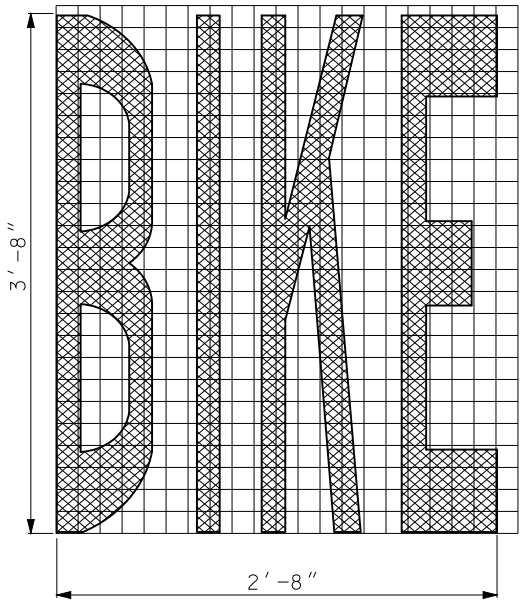
WORD MARKING
ELONGATED WORD & SYMBOL



BICYCLE SYMBOL

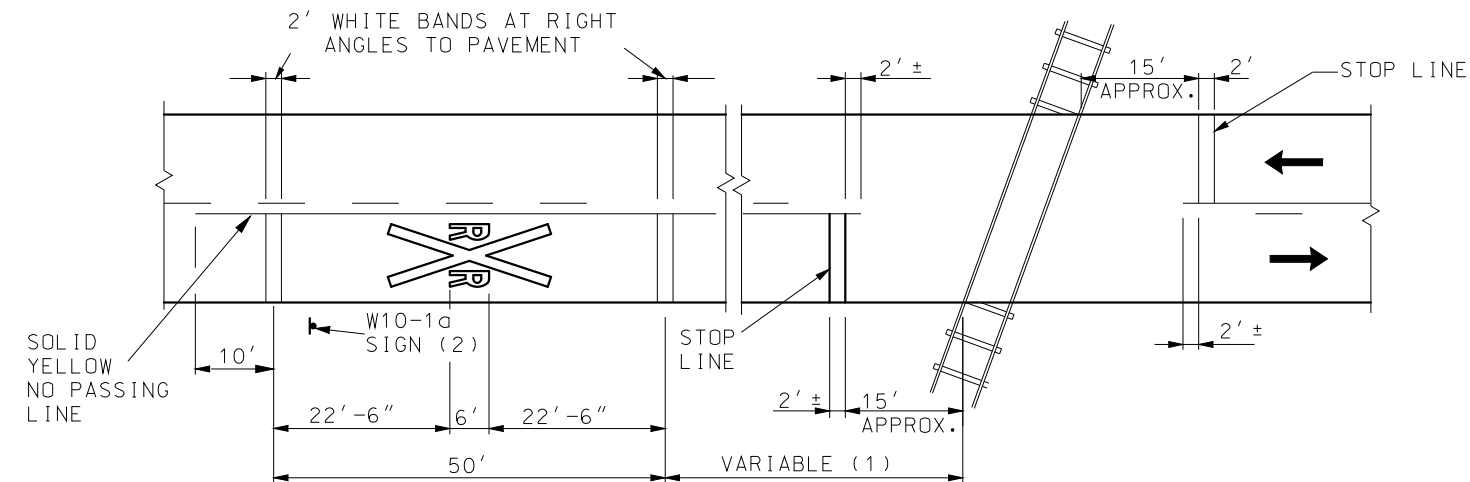


WORD MARKING
ELONGATED WORD & SYMBOL



| | |
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| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | PAVEMENT MARKING |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/17/2016 | 620.00L |
| SHEET NO. 4 OF 5 | |

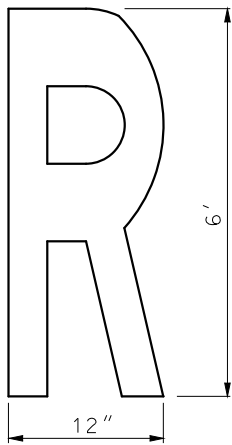
1. STOP LINES SHALL BE PLACED 90° TO THE ROADWAY.
2. IF RAILROAD GATE IS PRESENT THE STOP LINE SHALL BE 8' FROM GATE.



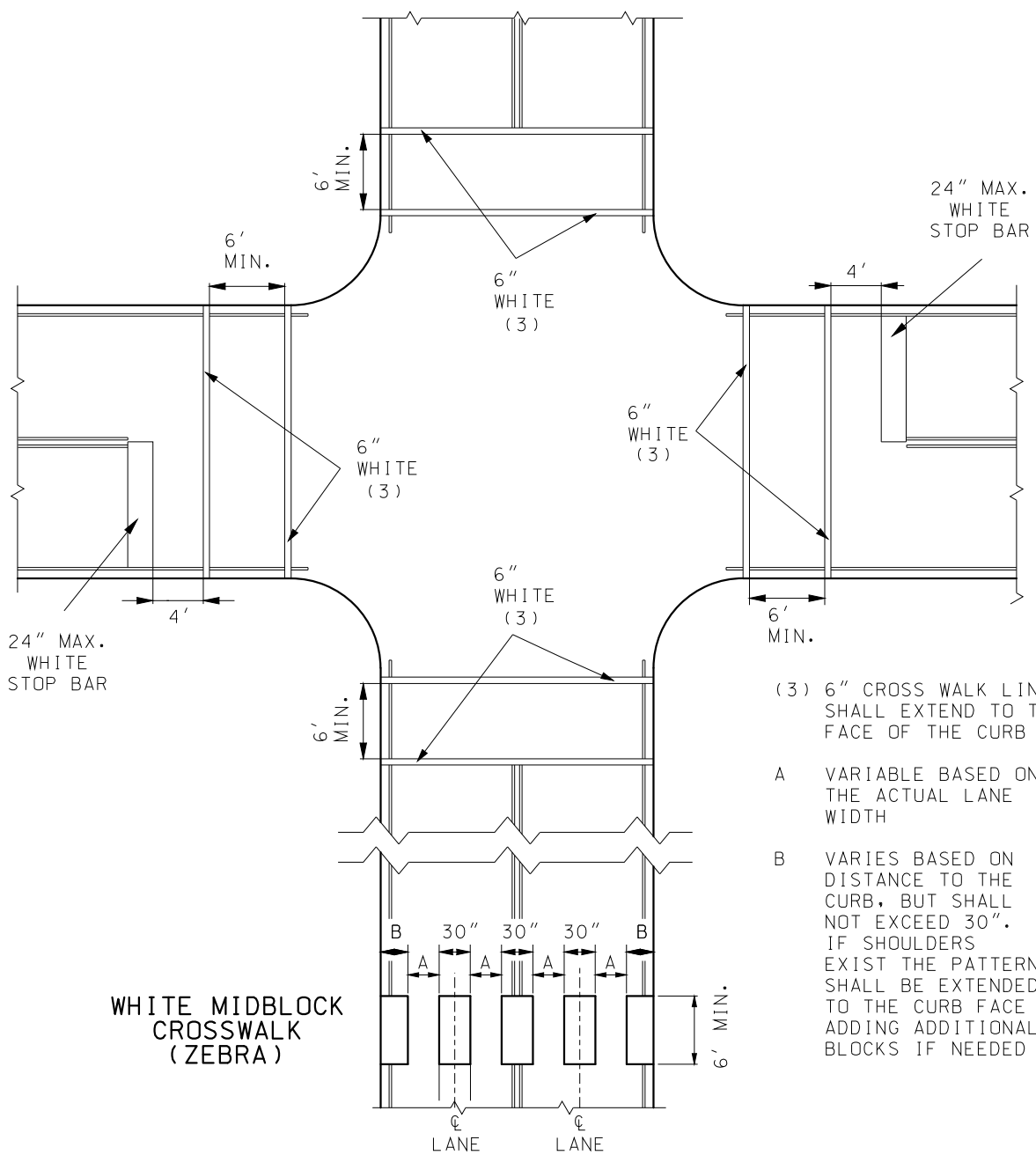
PAVEMENT DETAIL

- (1) THE DISTANCE FROM THE RAILROAD CROSSING MARKING TO THE NEAREST TRACK WILL VARY ACCORDING TO THE APPROACH SPEED AND THE SIGHT DISTANCE OF THE VEHICULAR TRAFFIC APPROACHING, BUT SHALL BE NO LESS THAN 50 FEET.
A THREE-LANE ROADWAY SHALL BE MARKED WITH A CENTERLINE FOR TWO-LANE APPROACH OPERATION ON THE APPROACH TO A CROSSING. ON MULTI-LANE ROADWAYS THE TRANSVERSE BANDS SHALL EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL "R X R" SYMBOLS SHALL BE USED IN EACH APPROACH LANE.

- (2) PLACEMENT OF W10-1a SIGN BY OTHERS.

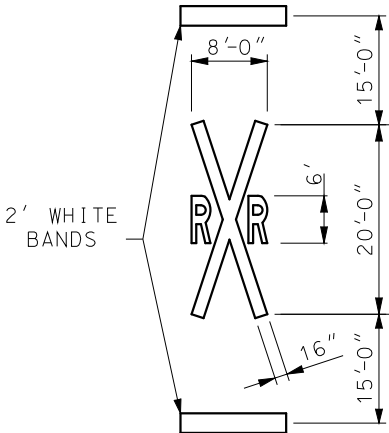


LETTER DETAIL



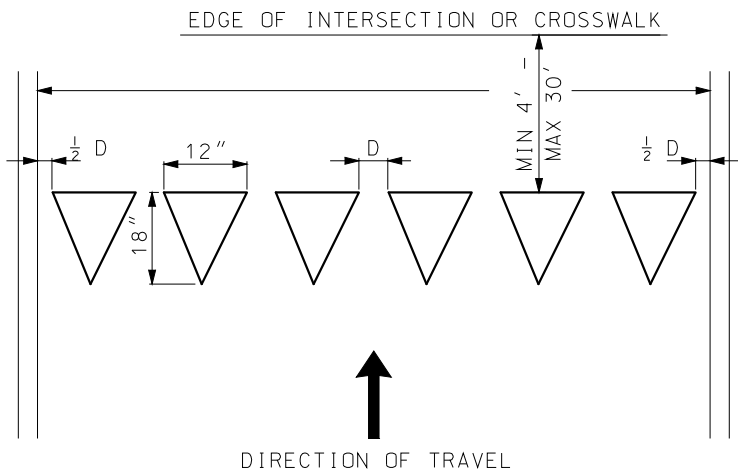
PEDESTRIAN CROSSWALKS

- (3) 6" CROSS WALK LINE SHALL EXTEND TO THE FACE OF THE CURB
A VARIABLE BASED ON THE ACTUAL LANE WIDTH
B VARIES BASED ON DISTANCE TO THE CURB, BUT SHALL NOT EXCEED 30". IF SHOULDERS EXIST THE PATTERN SHALL BE EXTENDED TO THE CURB FACE ADDING ADDITIONAL BLOCKS IF NEEDED



SYMBOL DETAIL


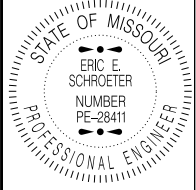
RAILROAD GRADE CROSSING

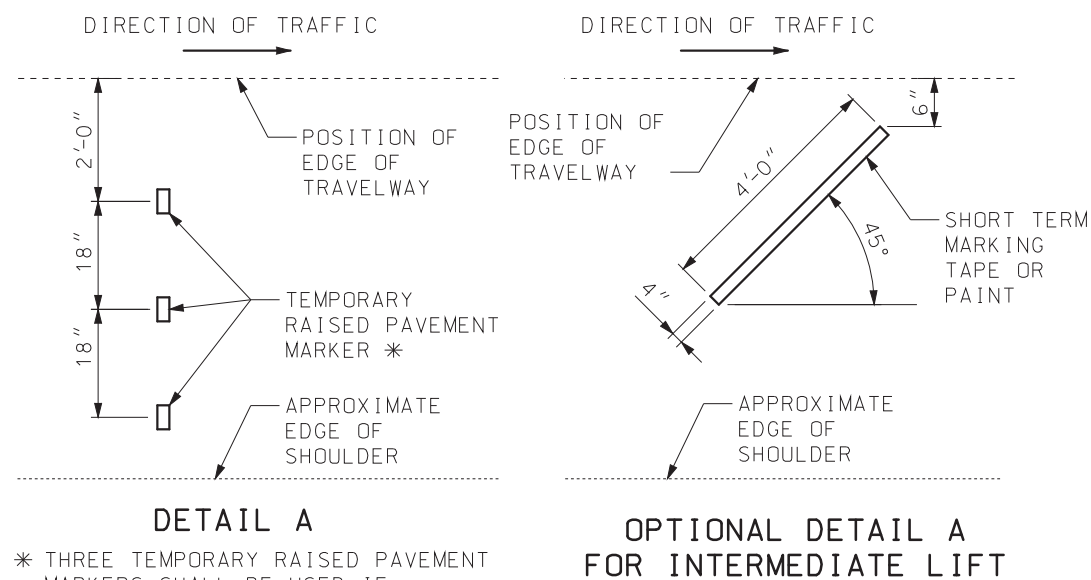
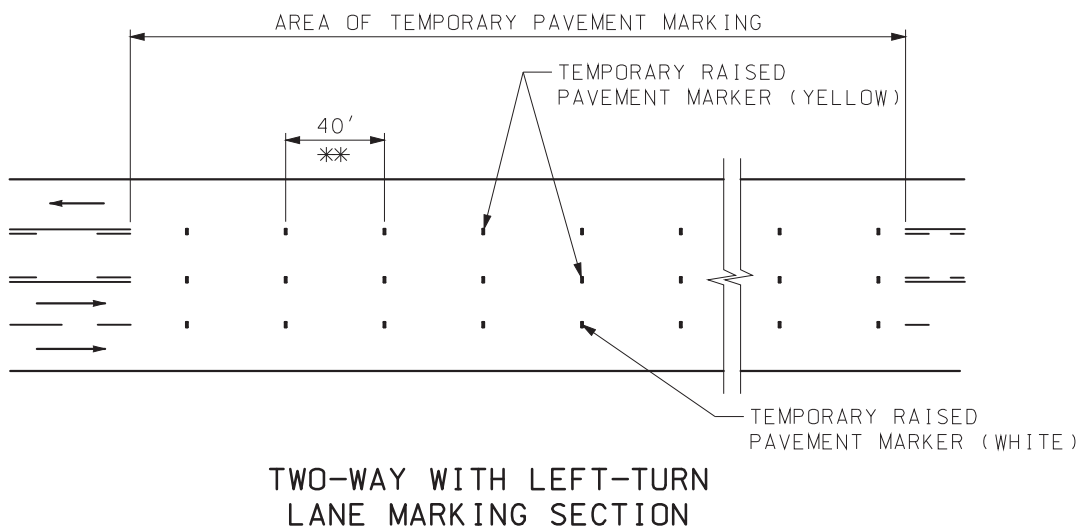
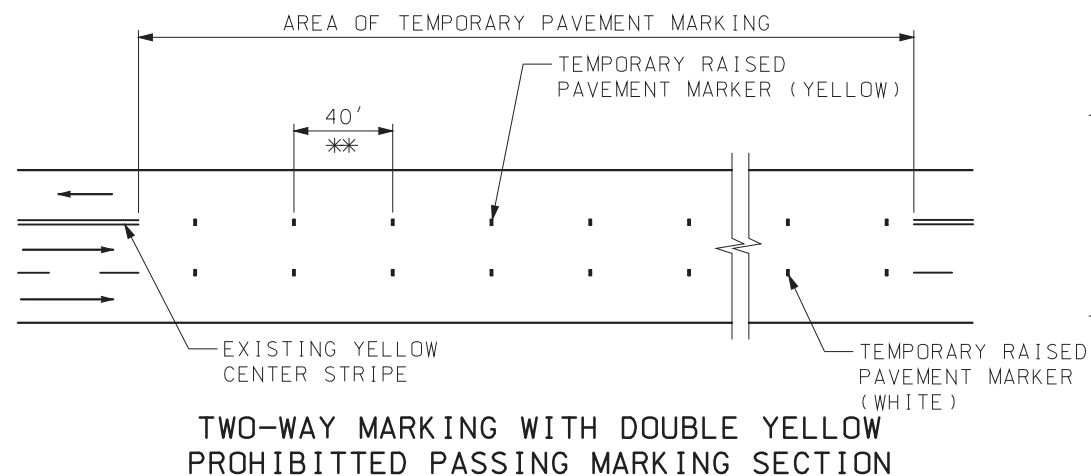


WHITE YIELD LINE TRIANGLES

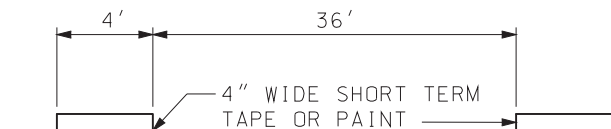
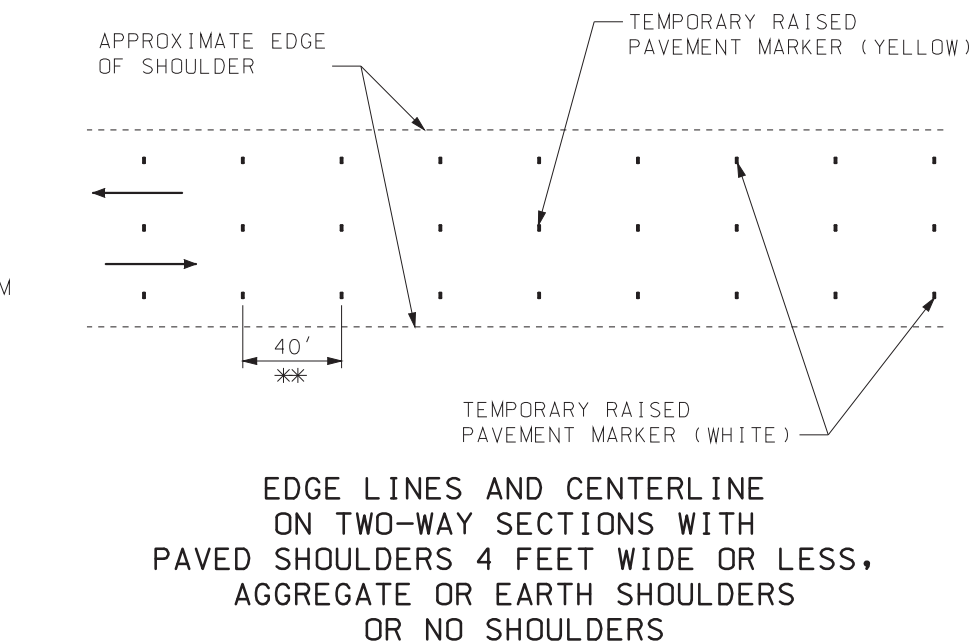
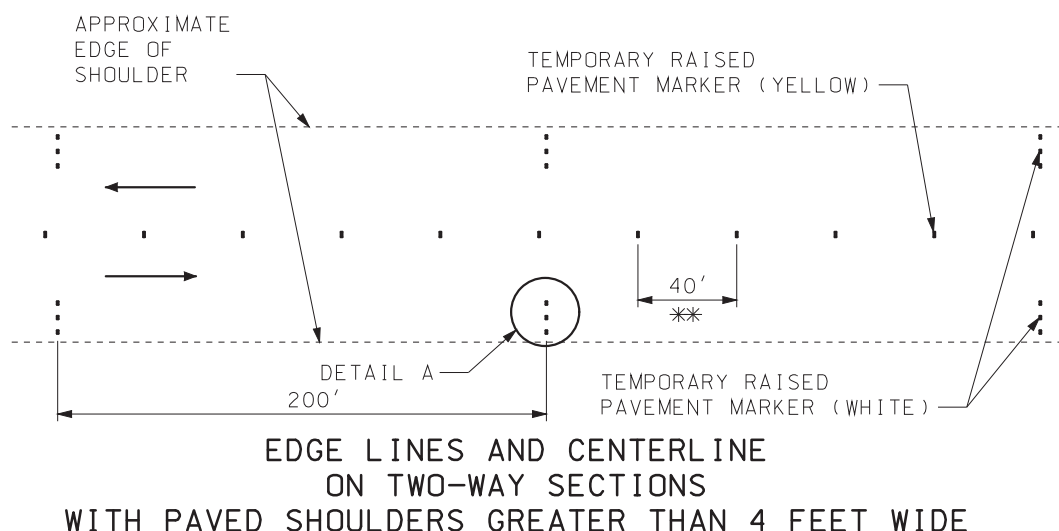
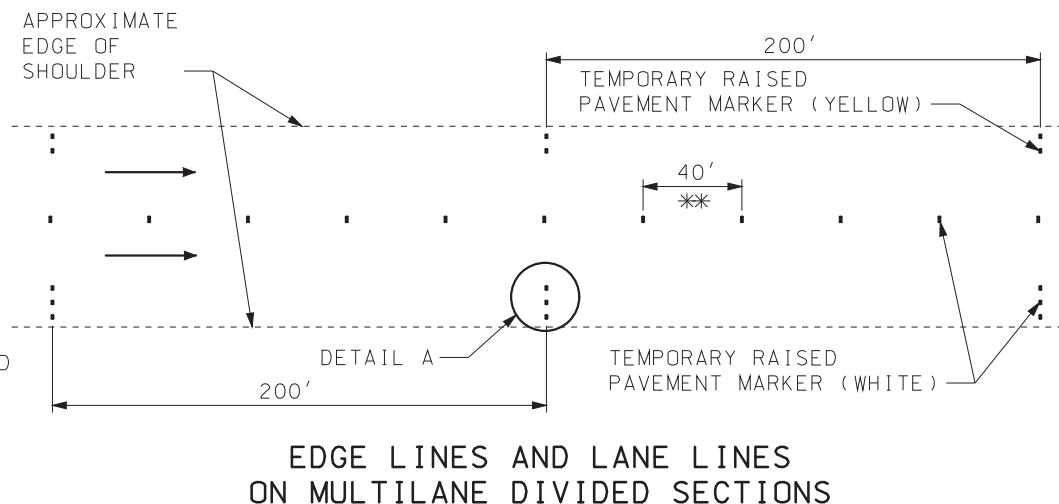
$D = 3" \text{ TO } 12"$

TRIANGLES SHALL BE UNIFORMLY SPACED AND COVER THE COMPLETE WIDTH OF THE TRAVEL LANE. SPACING SHALL BE ADJUSTED SO THERE ARE NO PARTIAL TRIANGLES WITHIN THE YIELD MARKING.

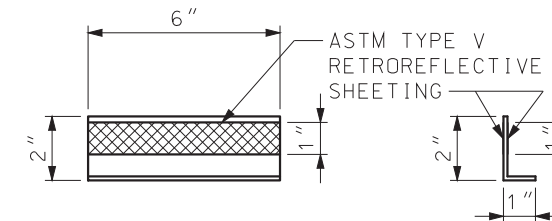
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> | PAVEMENT MARKING |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/17/2016 | SHEET NO. 5 OF 5 |



* THREE TEMPORARY RAISED PAVEMENT MARKERS SHALL BE USED IF SHOULDER IS 6' OR WIDER. OTHERWISE, USE TWO TEMPORARY RAISED PAVEMENT MARKERS.



**** OPTIONAL TEMPORARY PAVEMENT MARKING DETAIL FOR INTERMEDIATE LIFTS**



ELEVATION SIDE

GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IS REQUIRED WHEN 200 CONSECUTIVE LINEAR FEET OR MORE OF PERMANENT PAVEMENT MARKING HAS BEEN OBLITERATED, OR AS DIRECTED BY THE ENGINEER.

TEMPORARY RAISED PAVEMENT MARKERS (TRPMS), OR THE OPTIONAL 4"X 4' SHORT TERM TAPE OR PAINT, WHEN ALLOWED, SHALL BE MAINTAINED IN PLACE AND RETROREFLECTIVE UNTIL THE PERMANENT PAVEMENT MARKINGS ARE INSTALLED. MISSING OR NON-REFLECTIVE MARKINGS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE COMMISSION WHEN 10% OR MORE ARE DEFICIENT WITHIN ONE MILE OR WHEN 4 OR MORE CONSECUTIVE MARKINGS ARE DEFICIENT.

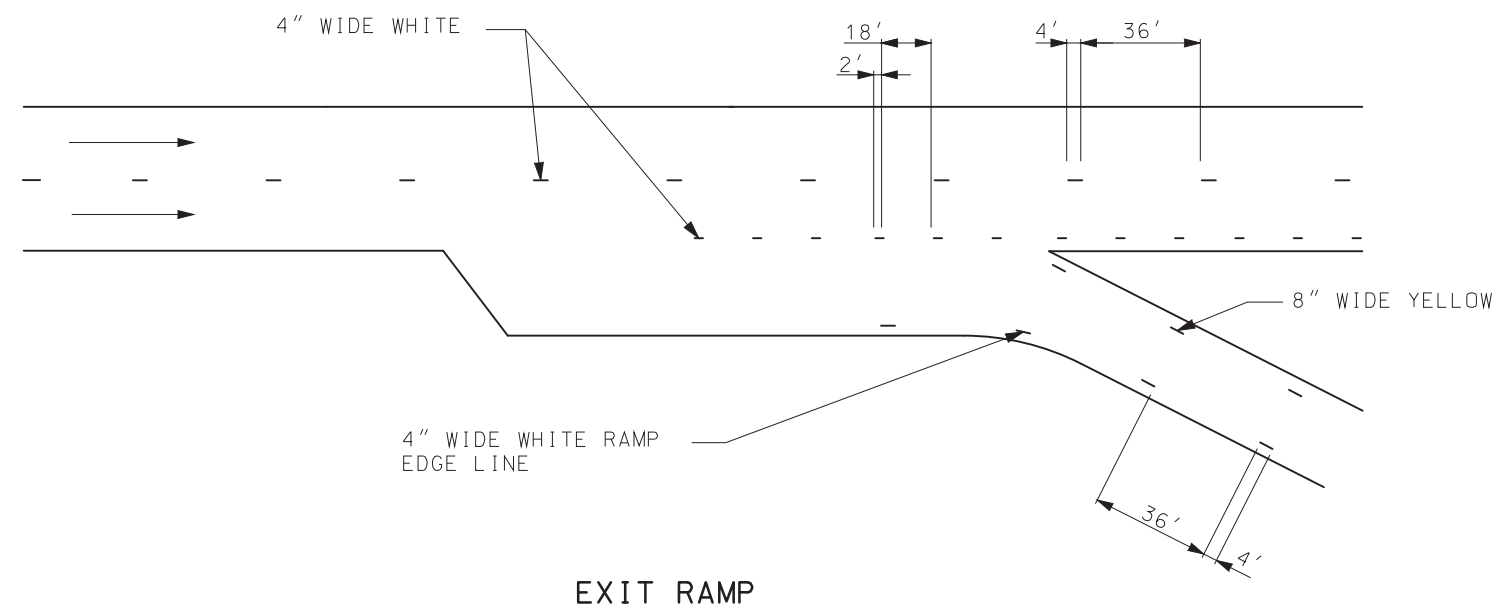
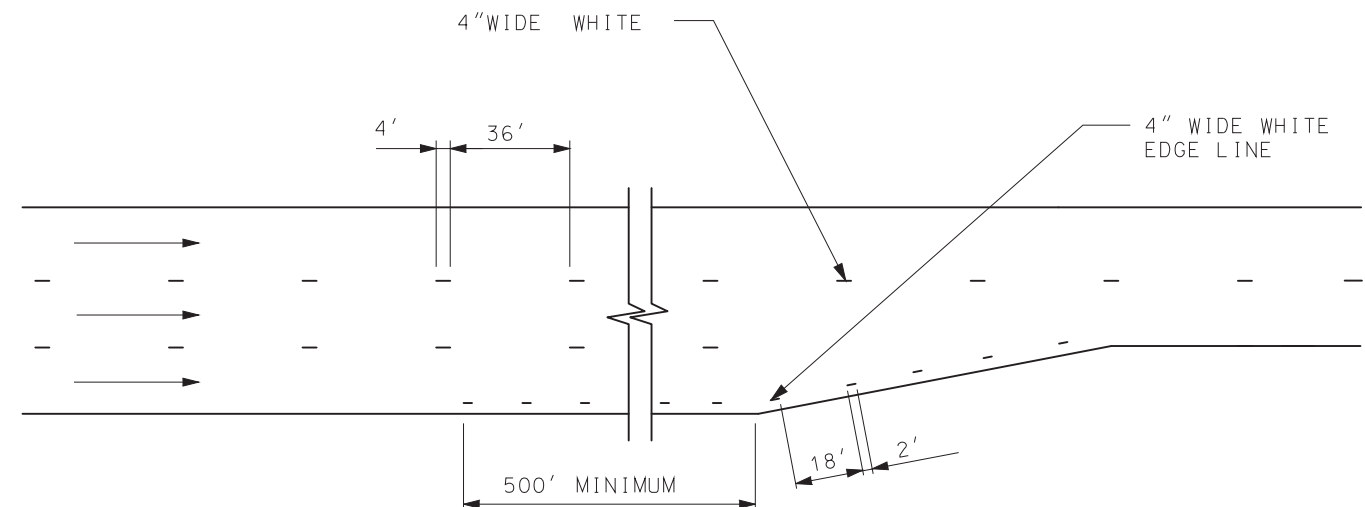
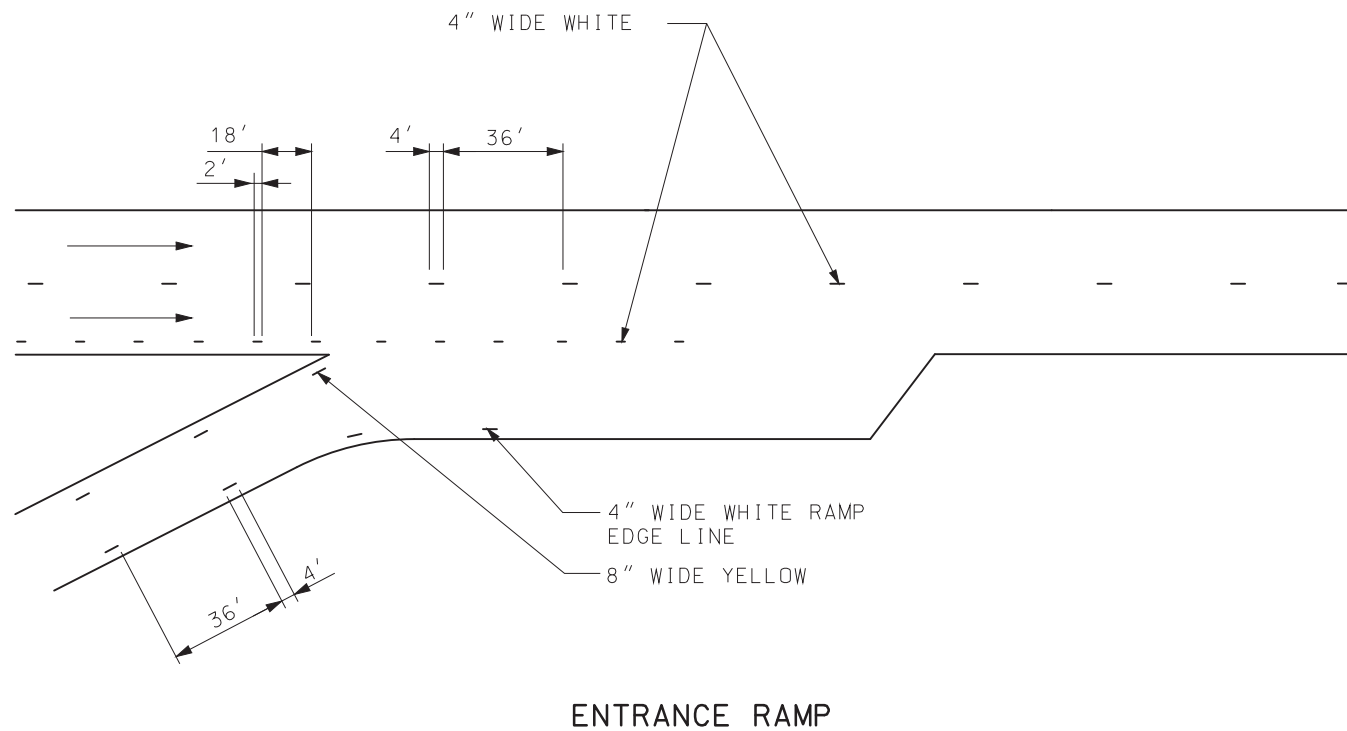
FOR INTERMEDIATE LIFTS, 4"X 4' SHORT TERM TAPE OR TEMPORARY PAINT MAY BE USED IN LIEU OF TRPMS.

TRPMS USED ON INTERMEDIATE LIFTS SHALL BE REMOVED PRIOR TO PLACEMENT OF THE NEXT LIFT.

ALL TEMPORARY MARKINGS SHALL BE REMOVED BY THE CONTRACTOR AFTER INSTALLATION OF PERMANENT MARKINGS, EXCEPT WHEN PERMANENT MARKINGS ARE TO BE INSTALLED BY OTHERS.

TEMPORARY TAPE SHALL NOT BE USED FOR TEMPORARY MARKING ON THE FINAL SURFACE EXCEPT WHEN SPECIFIED IN THE PLANS.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY PAVEMENT MARKING</p> <p>TEMPORARY PAVEMENT MARKING</p> |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 620.10G |
| SHEET NO. 1 OF 5 | |

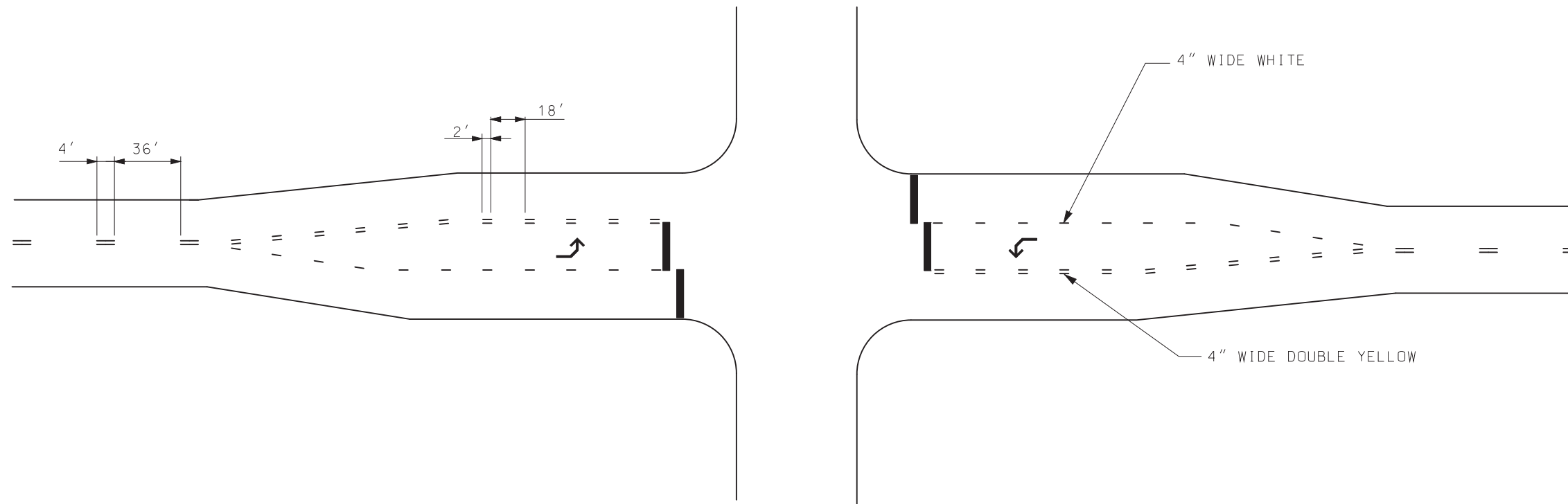


GENERAL NOTES:

TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMPS, GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING OF 2 FEET LONG AT A CYCLE OF 20 FEET.

LIMITS OF TEMPORARY GORE MARKING ARE THE SAME AS THE EXISTING GORE LINES.

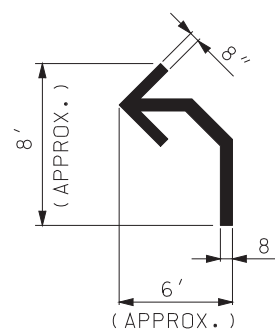
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY PAVEMENT MARKING LANE TRANSITION AND RAMP AREAS</p> |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 620.10G |
| SHEET NO. 2 OF 5 | |



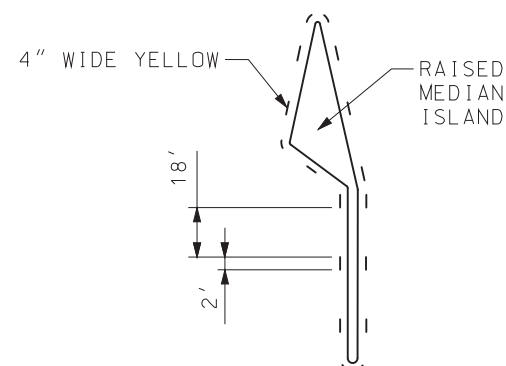
PLAN VIEW



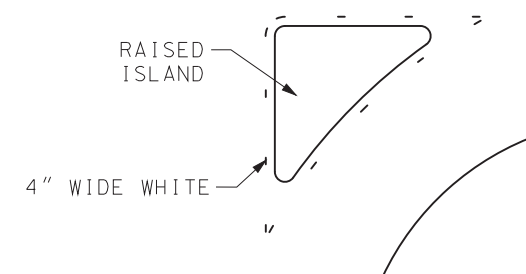
TEMPORARY STOP
BAR DETAIL (WHITE)



TEMPORARY ARROW
DETAIL (WHITE)



RAISED DIVISIONAL
ISLAND



RAISED CHANNELIZING
ISLAND

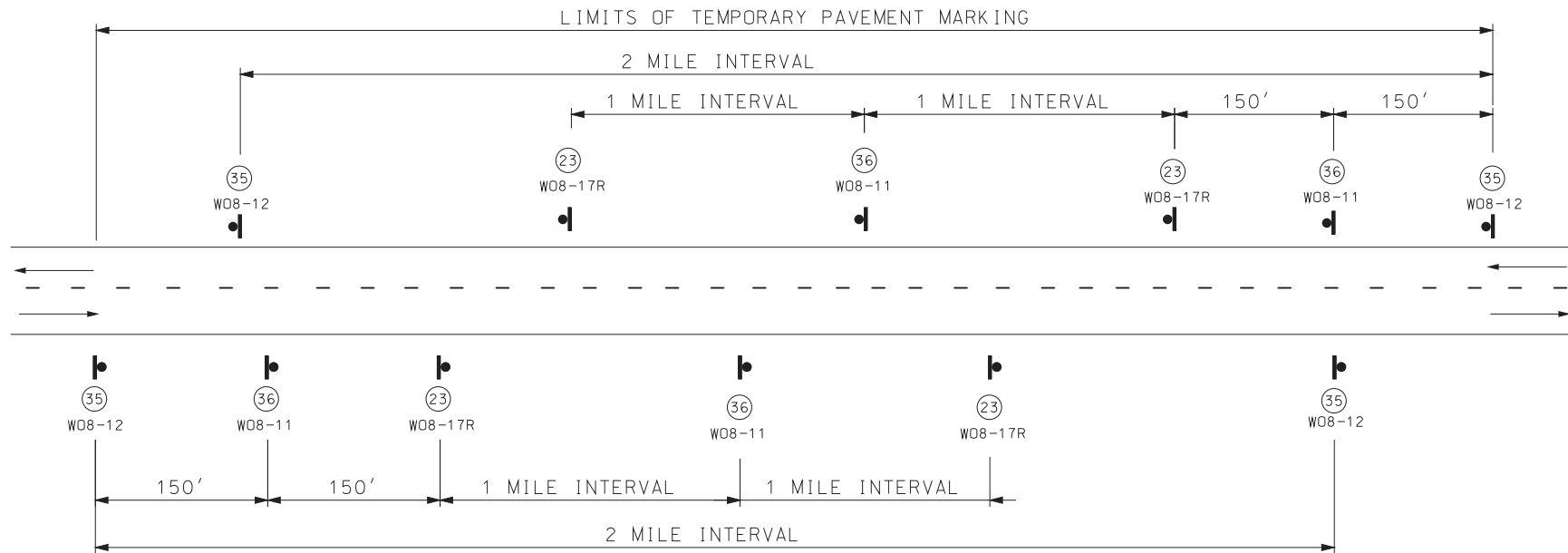
GENERAL NOTES:

TEMPORARY ARROWS AND STOP BARS ARE REQUIRED WHEN GOEMETRIC MODIFICATIONS DURING CONSTRUCTION CREATE LANE CONFIGURATIONS DIFFERENT THAN EXISTING, OR THE EXISTING PAVEMENT MARKING INCLUDES THEM.

YELLOW AND WHITE TEMPORARY MARKING AROUND ISLANDS ONLY REQUIRED WHEN THE ISLAND CURB IS NOT PAINTED.

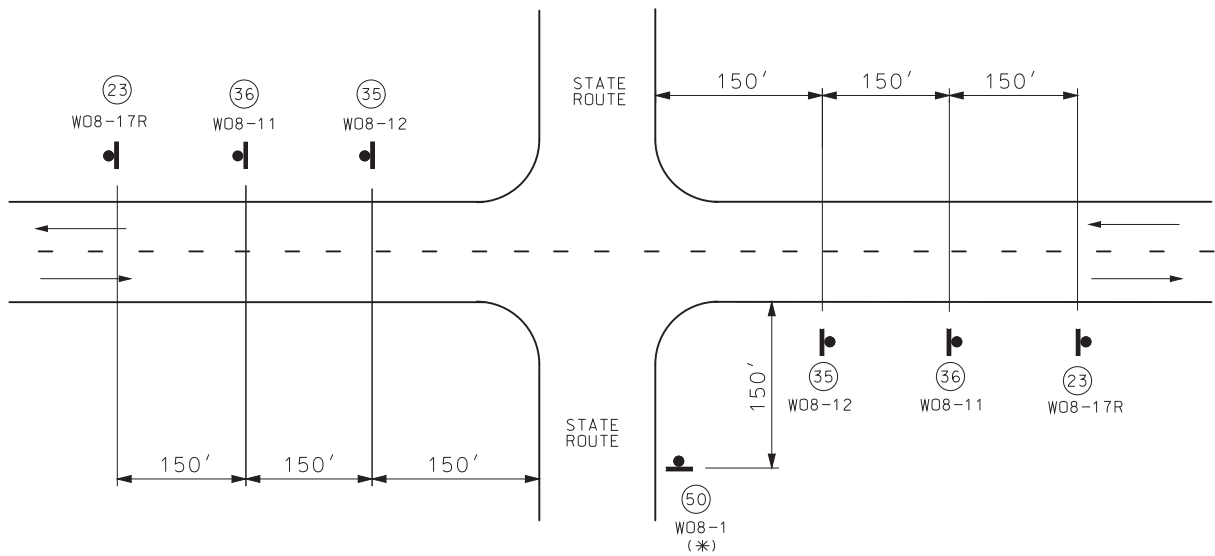
TEMPORARY PAVEMENT MARKING IN INTERSECTIONS, RAMP GORES AND OTHER TRANSITION AREAS USE AN INTERMITTENT MARKING 2' LONG AT A CYCLE OF 20'.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY PAVEMENT MARKING INTERSECTIONS</p> |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 620.10G |
| SHEET NO. 3 OF 5 | |



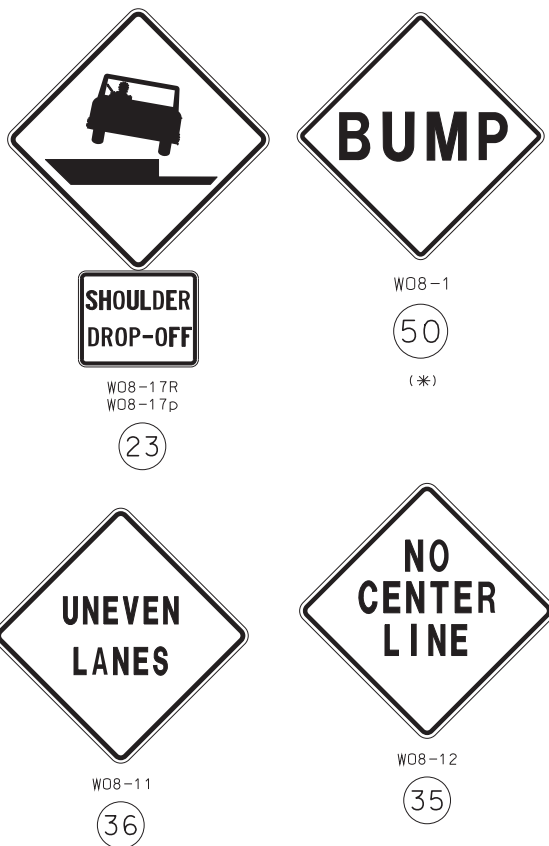
SIGN SPACING FOR MAINLINE

(DETAIL SHOWN IS BASED ON A PROJECT MEETING ALL CONDITIONS: NO CENTER STRIPE, UNEVEN LANES, SHOULDER DROP-OFF AND BUMP.)
WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXIST.
IF ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF), THE SIGN SPACING SHALL BE AT 1 MILE INTERVALS.



SIGN SPACING AT STATE ROUTE INTERSECTIONS

(*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



GENERAL NOTES:

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

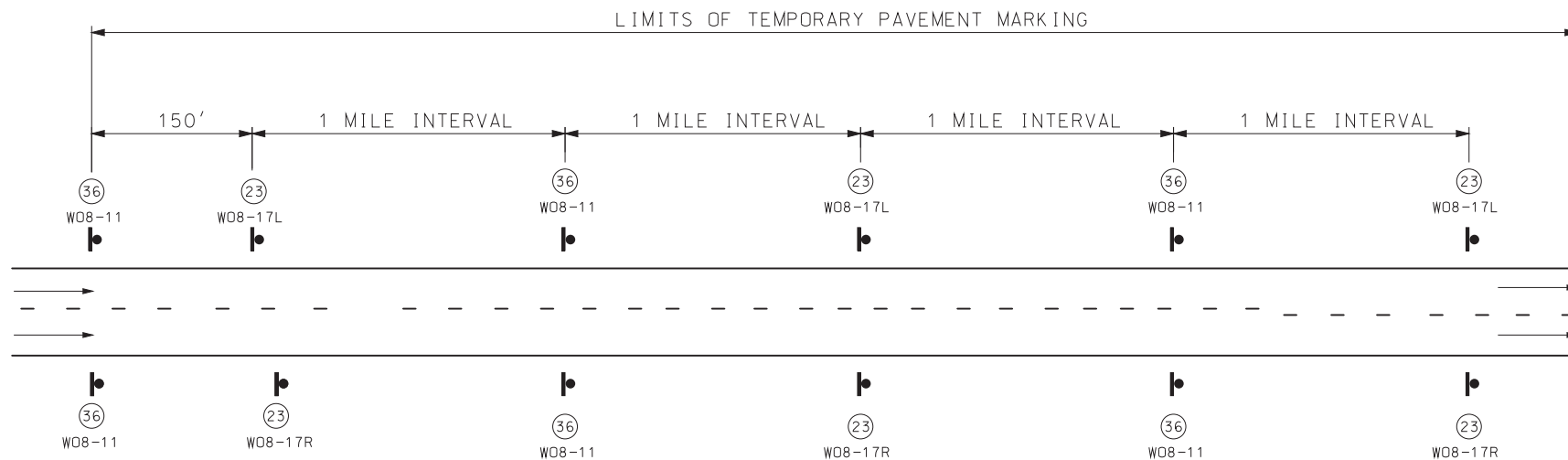
SIGN (35) AND TEMPORARY PAVEMENT MARKING INSTALLED WHERE CENTERLINE STRIPING HAS BEEN COVERED OR REMOVED. SIGNS ARE TO REMAIN IN PLACE UNTIL THE PERMANENT CENTERLINE PAVEMENT MARKINGS ARE IN PLACE. SIGNS SHALL BE COVERED OR REMOVED WHEN PAVEMENT CENTERLINE MARKING HAS BEEN INSTALLED.

SIGN (35) IS PLACED AT APPROXIMATELY TWO-MILE INTERVALS AND AT STATE ROUTE JUNCTIONS. WHEN THE INSTALLATION AT A JUNCTION IS WITHIN ONE-EIGHTH MILE OF THE NORMAL MAINLINE SIGN (35), THE LATTER MAY BE ELIMINATED.

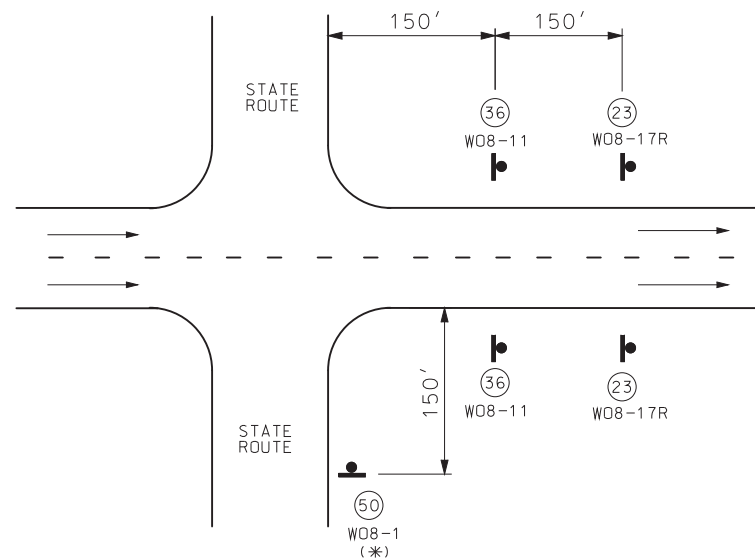
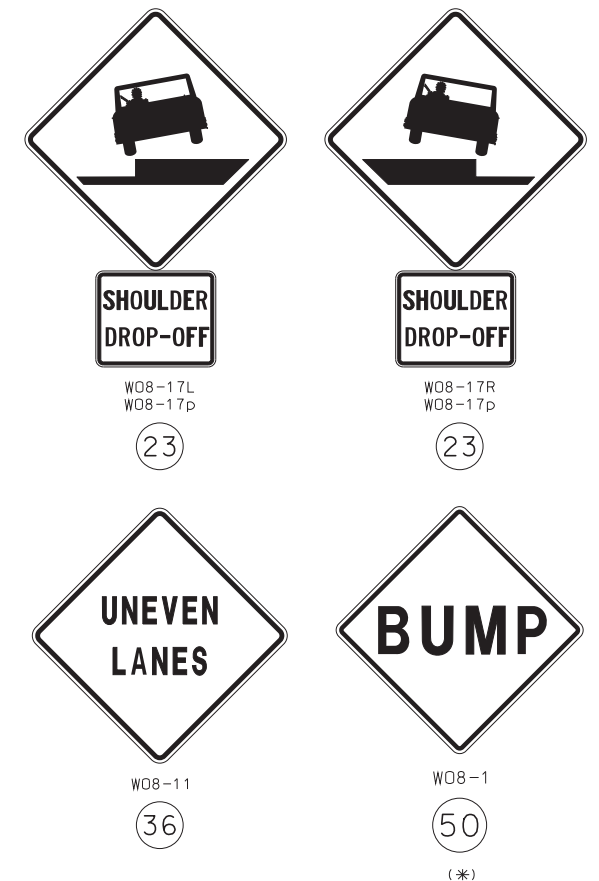
ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLAN 616.10 AND 903.03.

WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

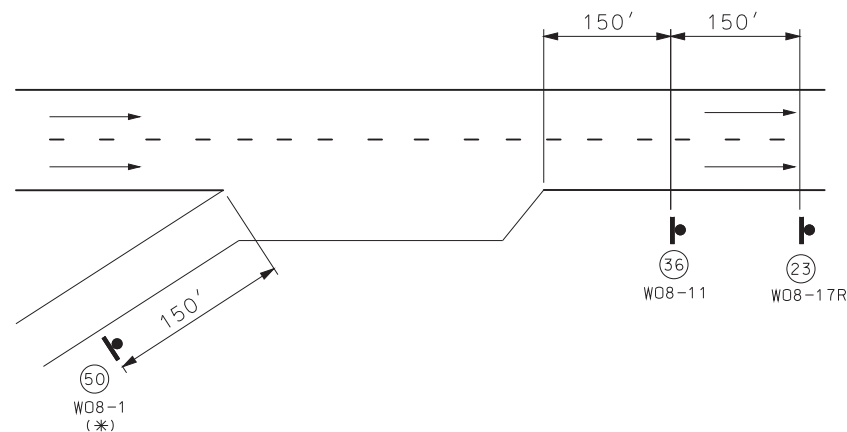
| | | | |
|--|--|--|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | | TEMPORARY PAVEMENT MARKING TWO-LANE TWO-WAY HIGHWAY | |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | | 620.10G | SHEET NO. 4 OF 5 |



SIGN SPACING FOR DIVIDED OR MULTI-LANE HIGHWAY
 (DETAIL SHOWN IS BASED ON A PROJECT MEETING CONDITIONS OF UNEVEN LANES AND SHOULDER DROP-OFF.)
 WHEN BOTH UNEVEN LANES AND SHOULDER DROP-OFF SIGNS ARE USED, BOTH SIGNS SHALL STAY IN PLACE UNTIL BOTH CONDITIONS NO LONGER EXISTS.
 WHEN ONLY ONE CONDITION EXISTS (UNEVEN LANES OR SHOULDER DROP-OFF), SIGN SPACING SHALL BE AT 1 MILE INTERVALS



SIGN SPACING AT STATE ROUTE INTERSECTIONS
 (*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.



SIGN SPACING AT RAMPS
 (*) BUMP SIGN SHOULD BE IN ACCORDANCE WITH STANDARD PLAN 619.10.

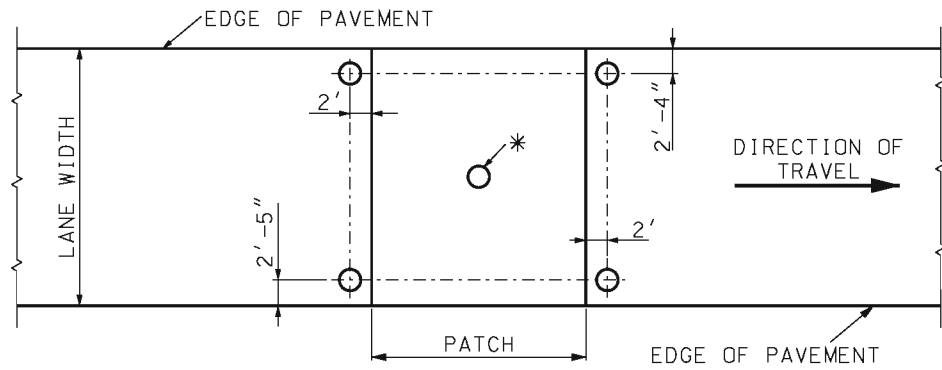
GENERAL NOTES:

FOR DETAILS OF TEMPORARY PAVEMENT MARKING, SEE SHEET 1 OF 5.

ALL SIGNS SHALL BE POST MOUNTED AND IN ACCORDANCE WITH STANDARD PLANS 616.10 AND 903.03.

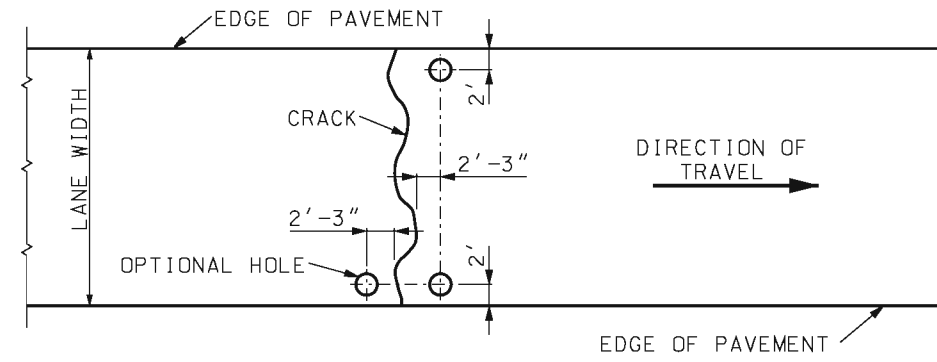
WHEN SHOULDER DROP-OFF SIGNS ARE IN PLACE FOR GREATER THAN THREE DAYS, THE SHOULDER DROP-OFF PLAQUE SHOULD BE USED IN ADDITION WITH THE SHOULDER DROP-OFF SIGN.

| | | | |
|--|---|---------|---------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | | |
| | TEMPORARY PAVEMENT MARKING DIVIDED AND MULTI-LANE HIGHWAYS | | |
| | DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | 620.10G | SHEET NO. 5 OF 5 |

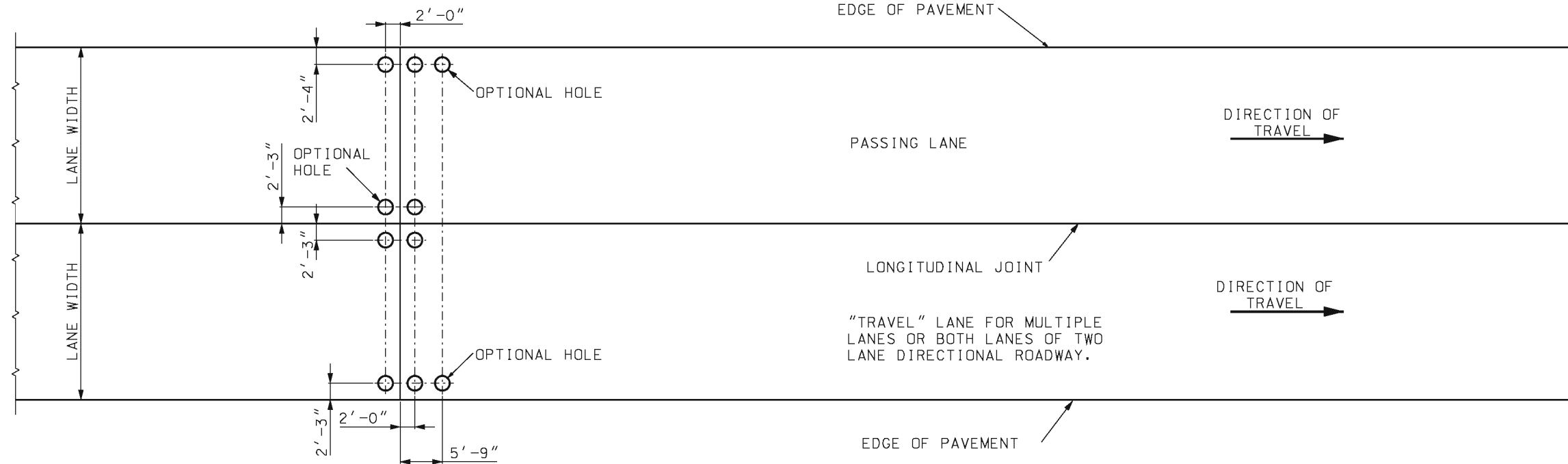


PATCH


* THIS HOLE SHOULD ONLY BE USED ON PATCHES EXISTING PRIOR TO CONSTRUCTION. THE HOLE SHOULD BE LOCATED CLOSE TO THE CENTER OF THE PATCH. BY USING THIS HOLE, THE TWO HOLES LOCATED AT THE SHOULDER COULD BE ELIMINATED.

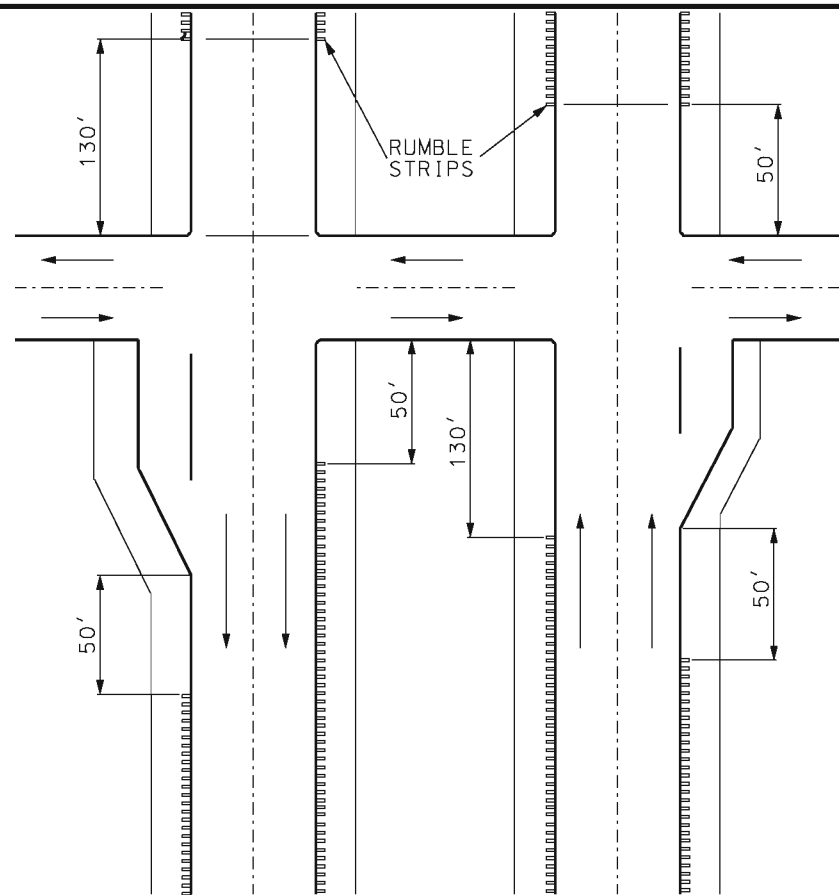


CRACK

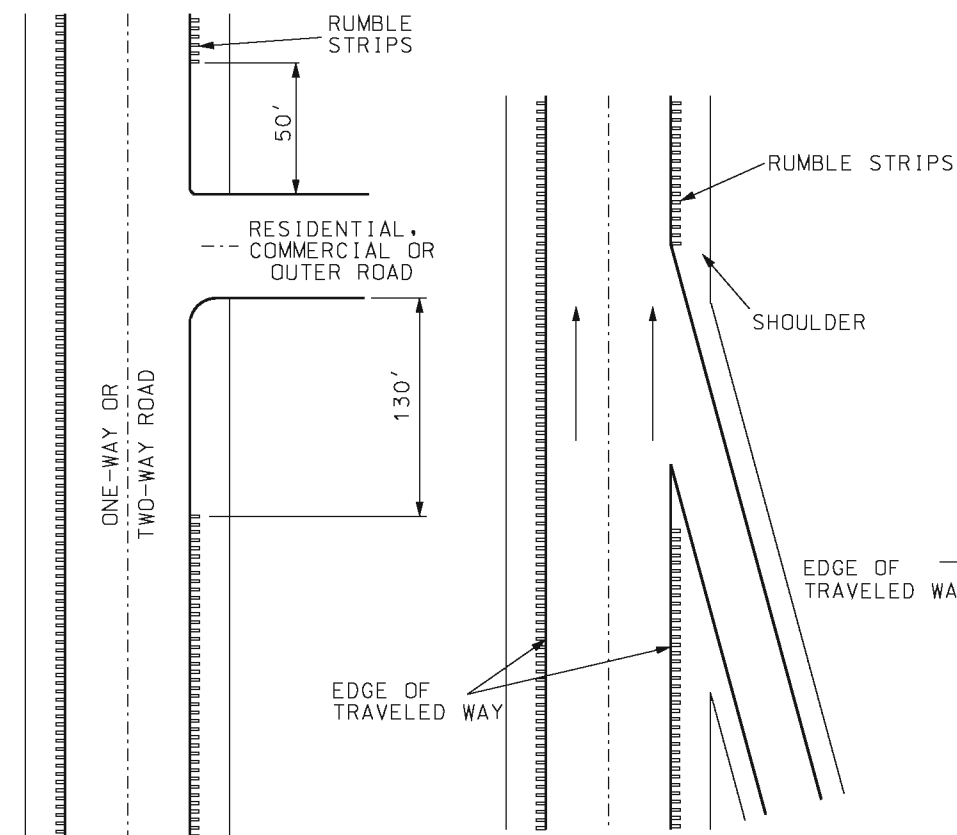


JOINT

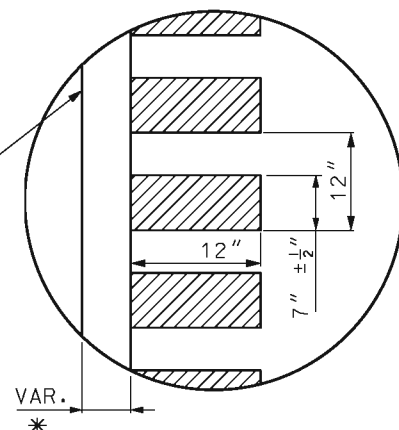
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|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION |
| DATE EFFECTIVE: 10/01/1998 DATE PREPARED: 8/21/2009 | 625.00 |
| SHEET NO. 1 OF 1 | |



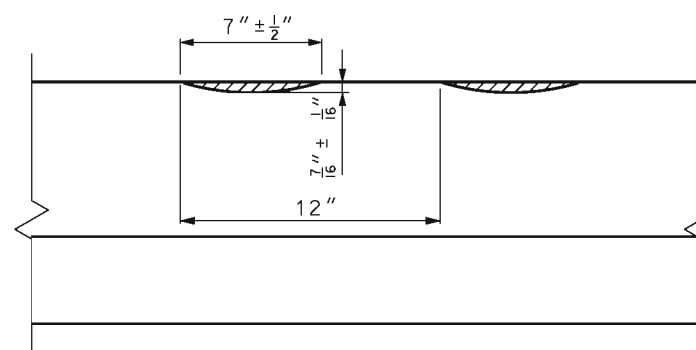
EXPRESSWAY DIVIDED



INTERSECTIONS
ACCELERATION OR DECELERATION LANE
RUMBLE STRIP LAYOUTS



RUMBLE STRIP
PLAN VIEW



RUMBLE STRIP CROSS SECTION VIEW

* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.

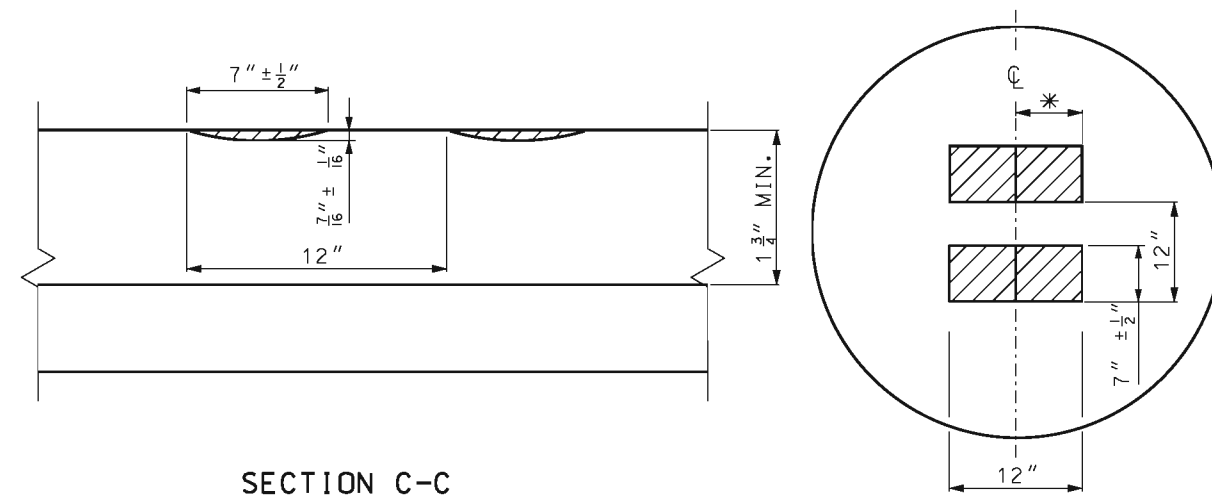
| | |
|--|--|
| 14' PAVEMENT STRUCTURES, ALL SHOULDER TYPES | |
| 13' PAVEMENT STRUCTURES, ALL SHOULDER TYPES | |
| PAVEMENT STRUCTURES ≤ 12' WITH A2 SHOULDER | |
| PAVEMENT STRUCTURES ≤ 12' WITH A3 SHOULDER | |
| PAVEMENT STRUCTURES ≤ 12' WITH EARTH OR AGGREGATE SHOULDER | |

GENERAL NOTES:

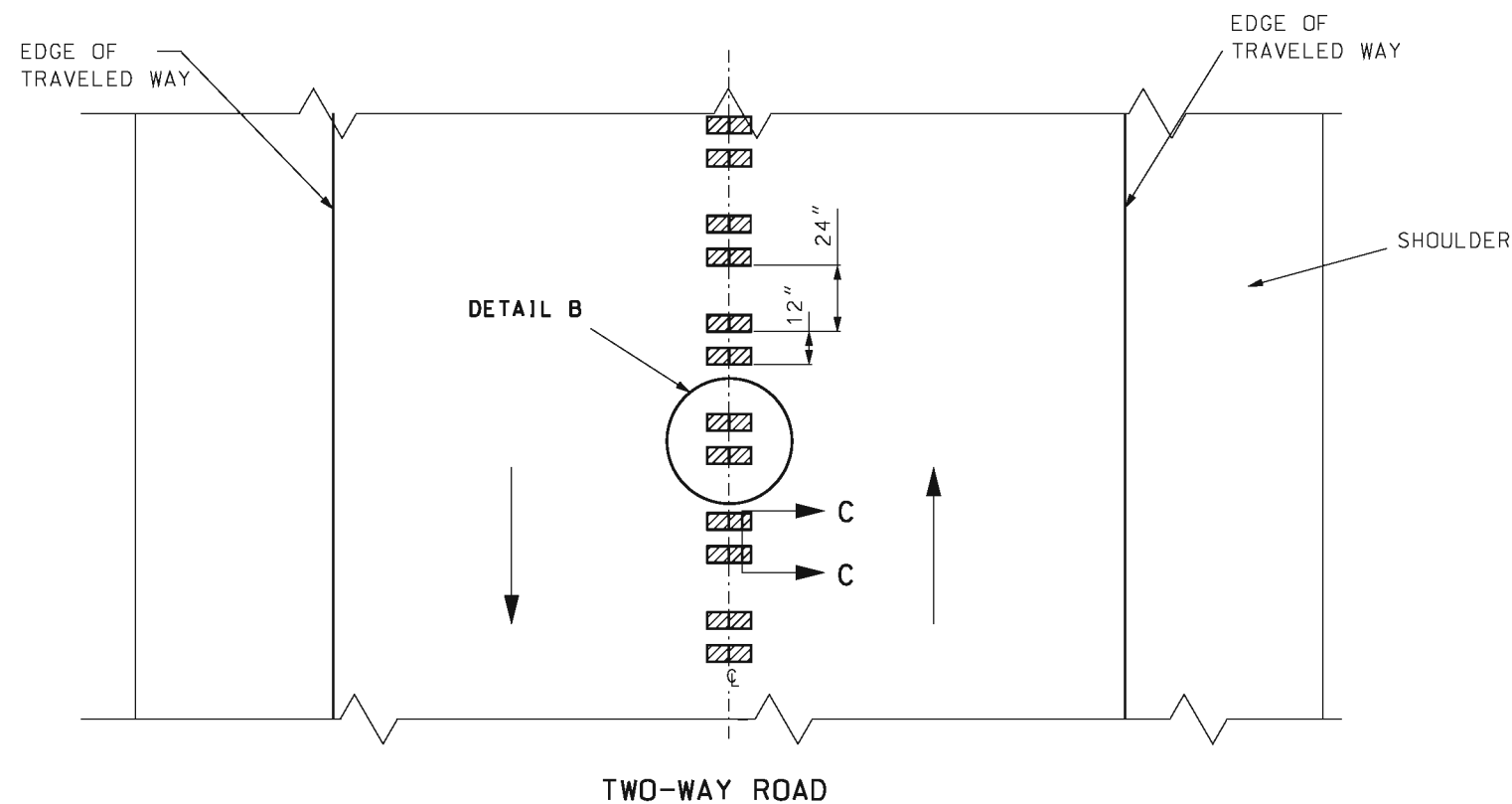
- SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.
- RUMBLE STRIPS SHALL BE OMITTED IF SHOULDERS ARE LESS THAN 2' WIDE.
- ALL RUMBLE STRIPS SHALL BE MILLED.
- RUMBLE STRIPS SHALL NOT BE MILLED ONTO TRANSVERSE JOINTS.
- RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

| | | |
|--|----------------------------------|---------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| | RUMBLE STRIPS SHOULDER | |
| DATE EFFECTIVE: 04/01/2009 DATE PREPARED: 2/20/2009 | 626.00H | SHEET NO. 1 OF 2 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



* = LATERAL DEVIATION SHALL NOT EXCEED ONE INCH IN 100 FEET.



GENERAL NOTES:

SEE STANDARD PLAN 620.00 FOR PAVEMENT MARKING.

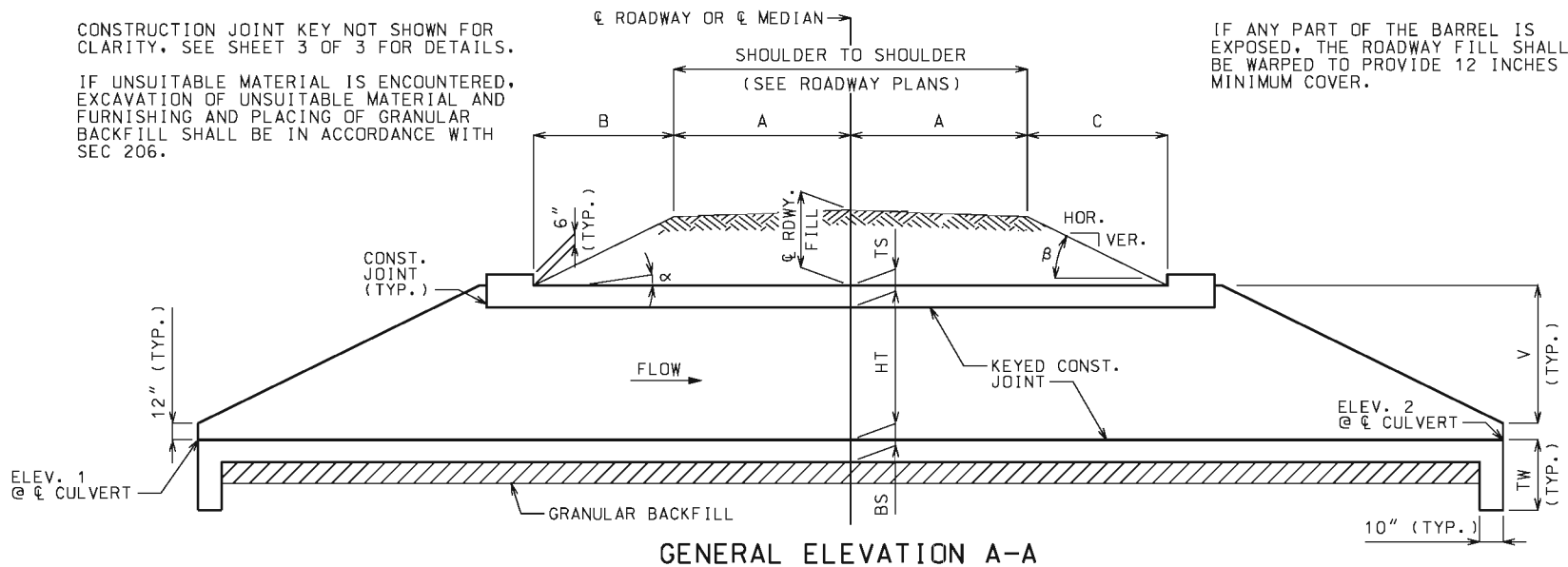
RUMBLE STRIPS SHALL NOT BE PLACED ON BRIDGES.

ALL RUMBLE STRIPS SHALL BE MILLED.

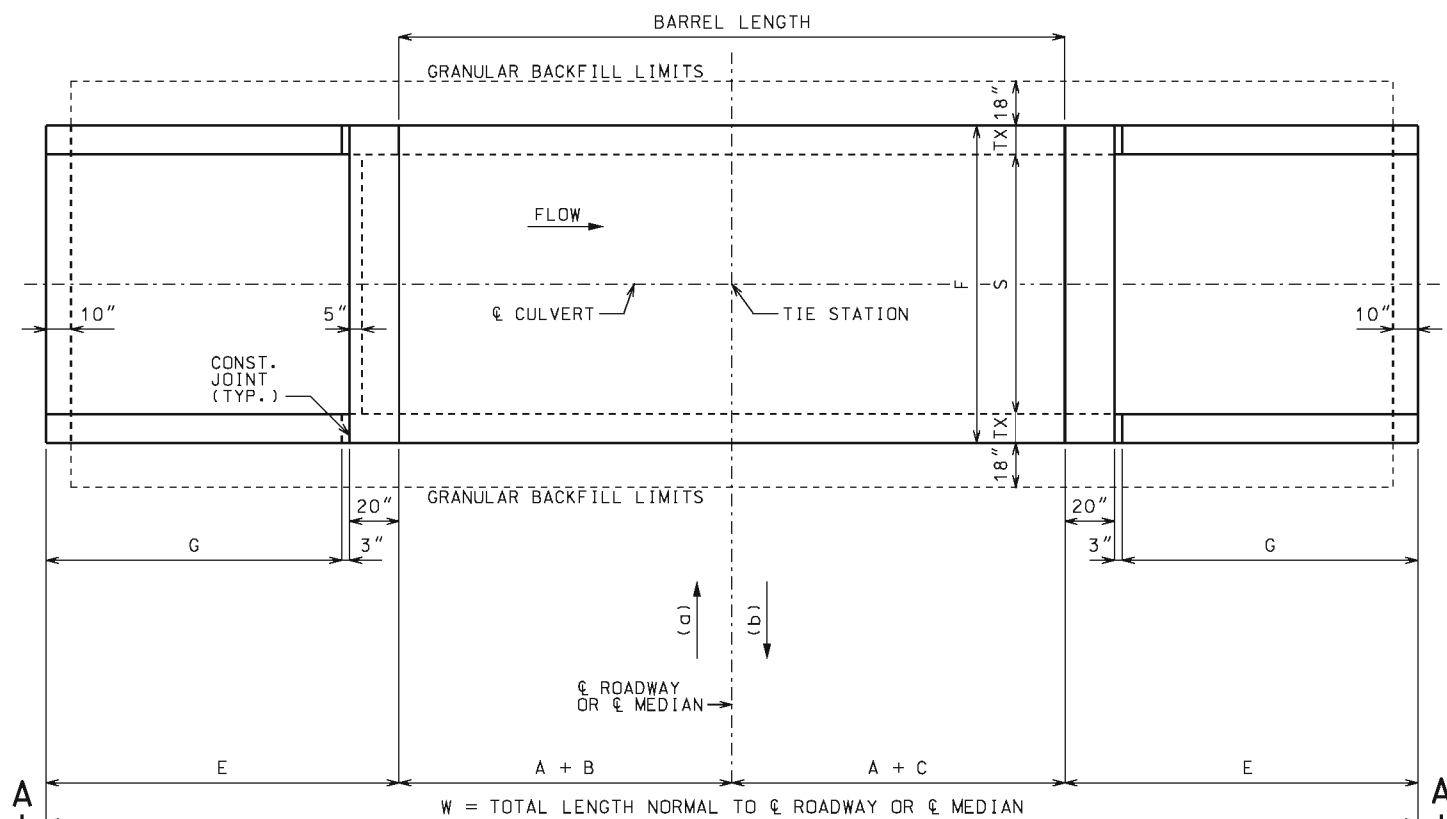
CENTERLINE RUMBLE STRIPS SHALL BE CONTINUOUS THROUGH CONNECTIONS OF SIDEROADS WITH NO LEFT TURN LANES.

DISCONTINUE CENTERLINE RUMBLE STRIPS THROUGH THE LIMITS OF ALL LEFT TURN LANES, INCLUDING ANY LANE TAPER SECTIONS.

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | RUMBLE STRIPS CENTERLINE |
| DATE EFFECTIVE: 04/01/2009 DATE PREPARED: 2/20/2009 | 626.00H |
| SHEET NO. 2 OF 2 | |



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING α , β , B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W} \right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = ϕ RDWY. FILL + $A(\text{CS}) - A(\text{TAN}\alpha)$
UPSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN
 $\text{TAN}\beta + \text{TAN}\alpha$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO = ϕ RDWY. FILL + $A(\text{CS}) + A(\text{TAN}\alpha)$
DOWNSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN
 $\text{TAN}\beta - \text{TAN}\alpha$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ϕ ROADWAY OR ϕ MEDIAN.

THE TERM " $A(\text{CS})$ " IS THE DIFFERENCE IN ELEVATION BETWEEN ϕ ROADWAY OR ϕ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ϕ ROADWAY OR ϕ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ϕ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ϕ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

| VARIABLE | DIMENSION |
|----------|--------------------------|
| α | SEE EQUATIONS |
| β | SEE EQUATIONS |
| B | SEE EQUATIONS |
| C | SEE EQUATIONS |
| E | G + 23" |
| F | S + 2TX |
| G | 2V |
| V | HT + TS - 12" |
| W | 2A + B + C + 2E |
| TW | MAX{3'-4" OR (BS + 12")} |

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)



DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) f'_c = 4,000 PSI
REINFORCING STEEL (GRADE 60) f_y = 60,000 PSI

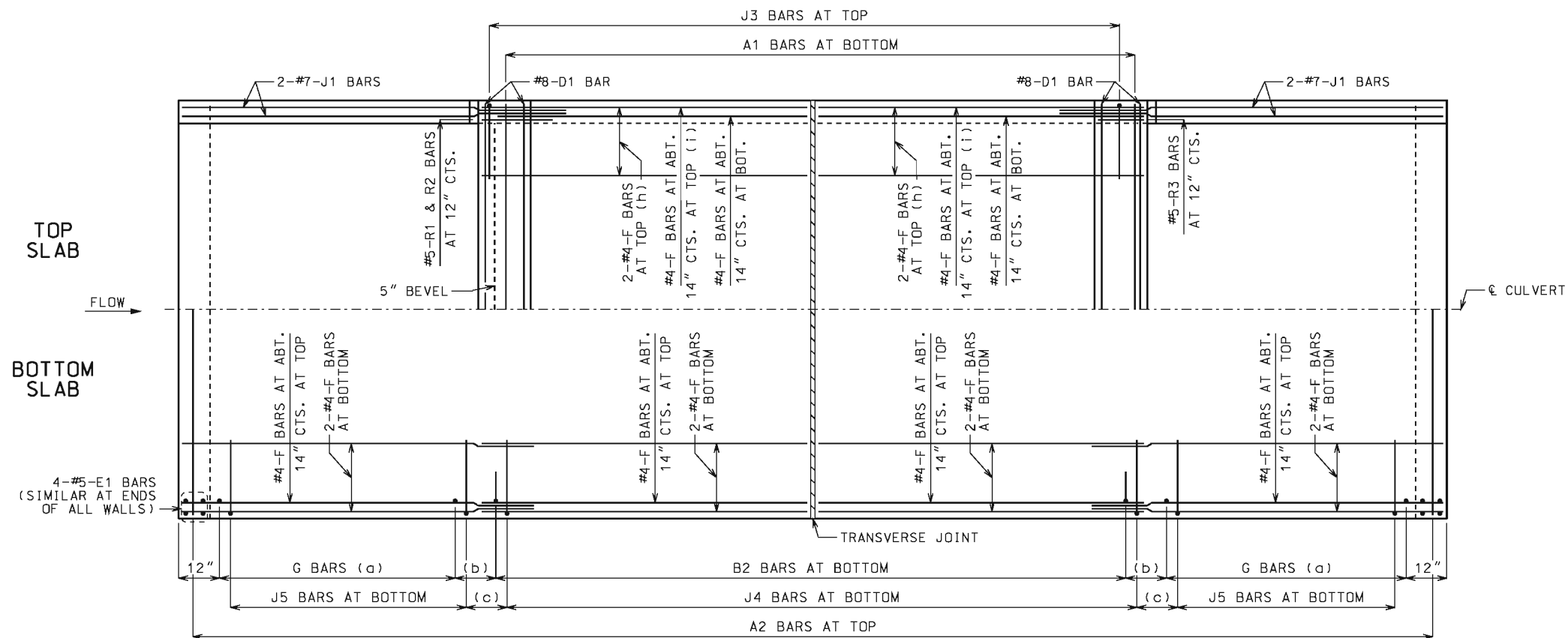
MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

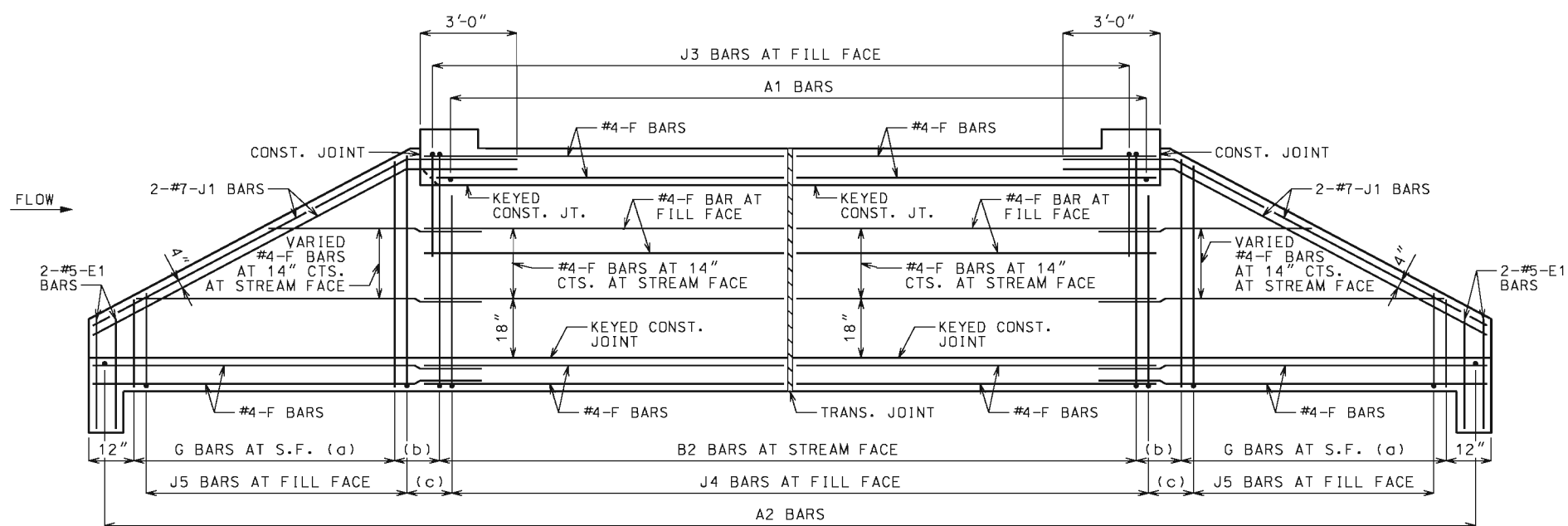
WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE SINGLE BOX CULVERT |
| | SKEW: SQUARED WINGS: STRAIGHT |
| LAYOUT | |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.10J |
| SHEET NO. 1 OF 3 | |



HALF PLANS

HALF PLANS ARE SYMMETRICAL ABOUT C CULVERT.



ELEVATION

J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) NOT SPECIFIED ON THIS SHEET


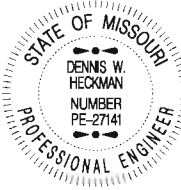
(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

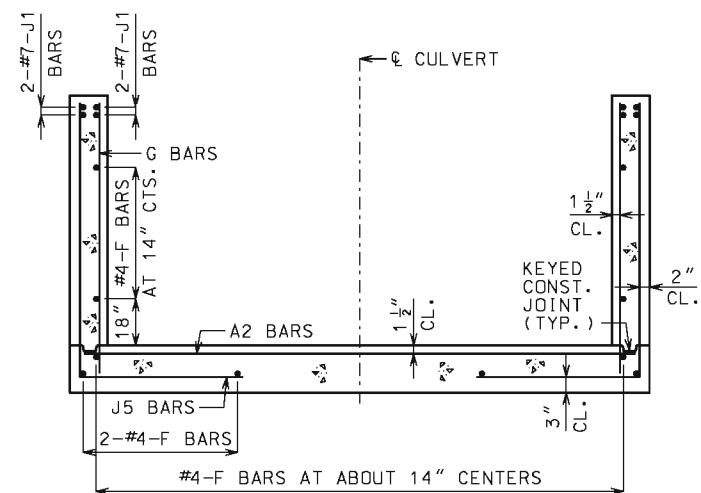
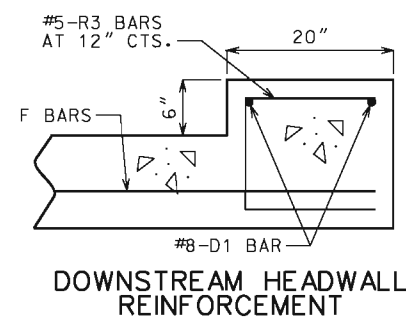
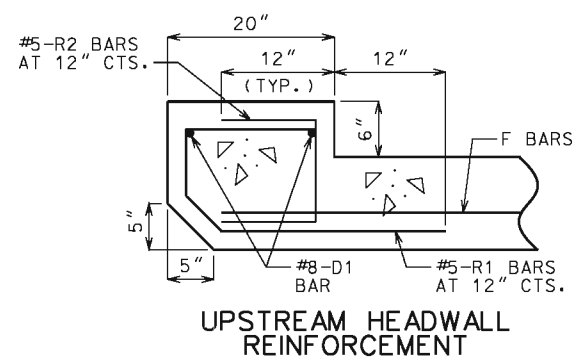
(i) FOR DESIGN FILLS 2'-0" OR LESS

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE SINGLE BOX CULVERT SKEW: SQUARED WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.10J |
| SHEET NO. 2 OF 3 | |

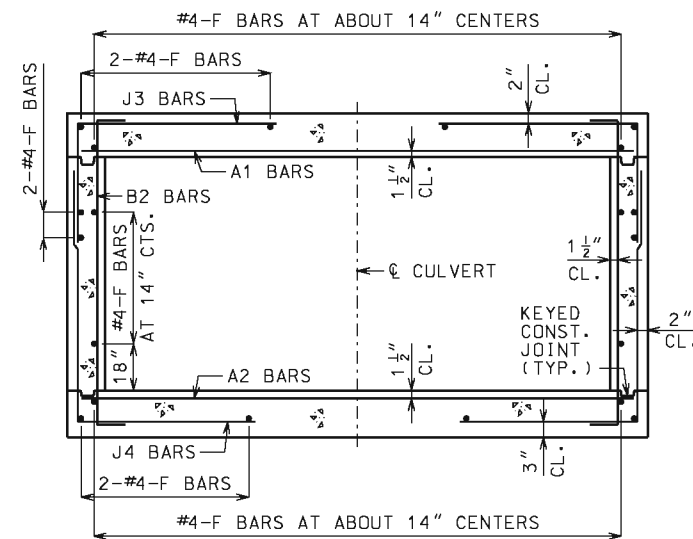


PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

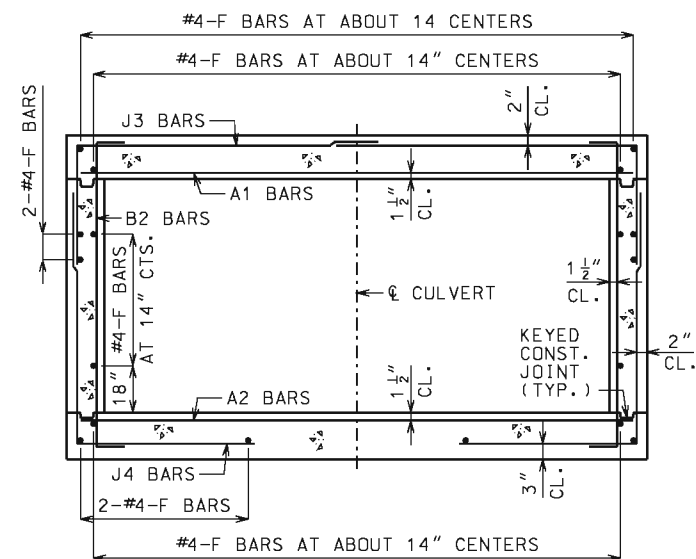
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

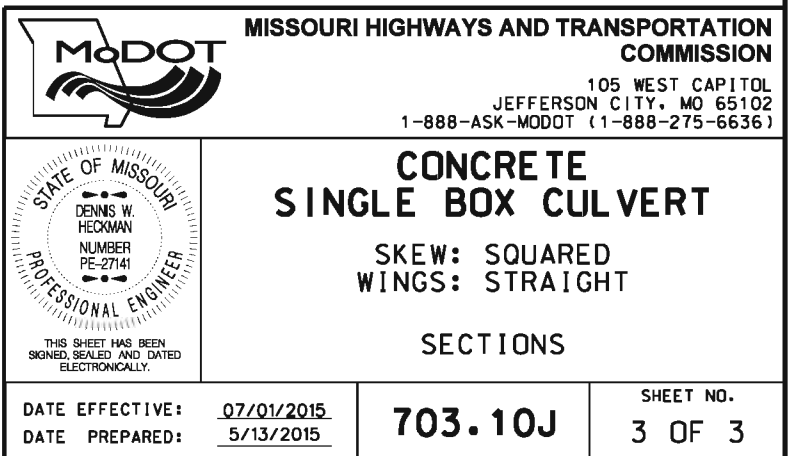
GENERAL NOTES:

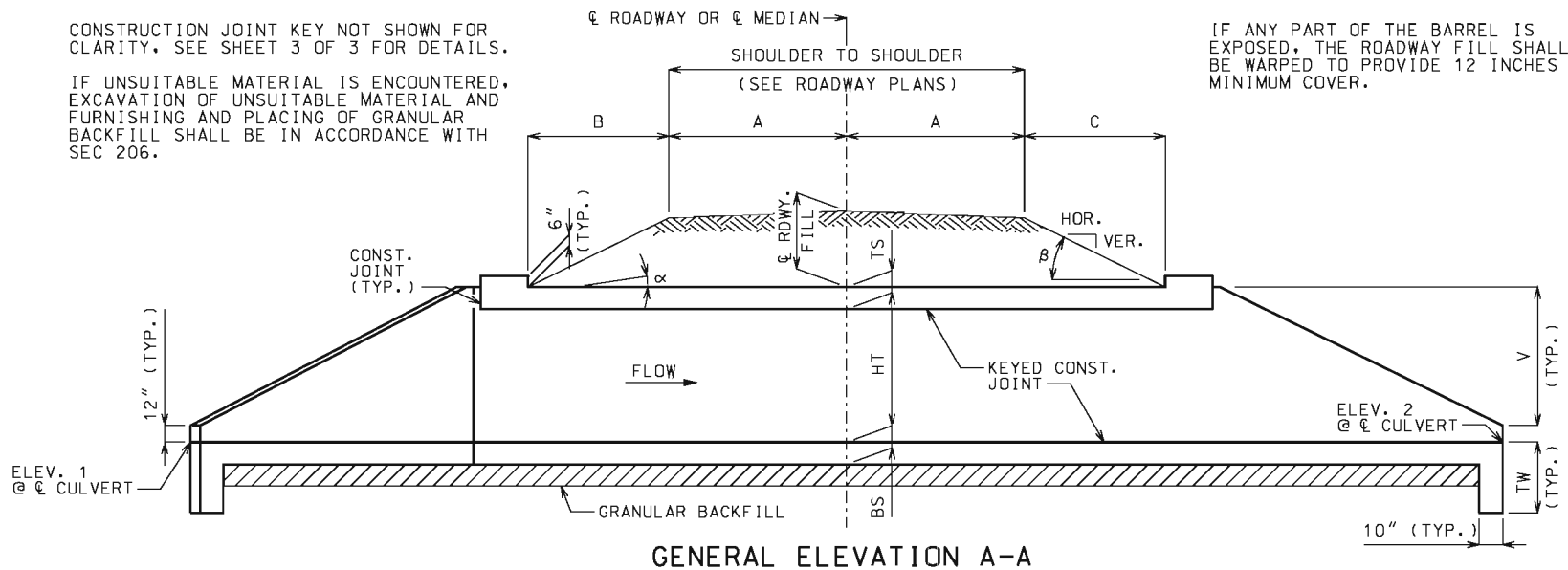
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

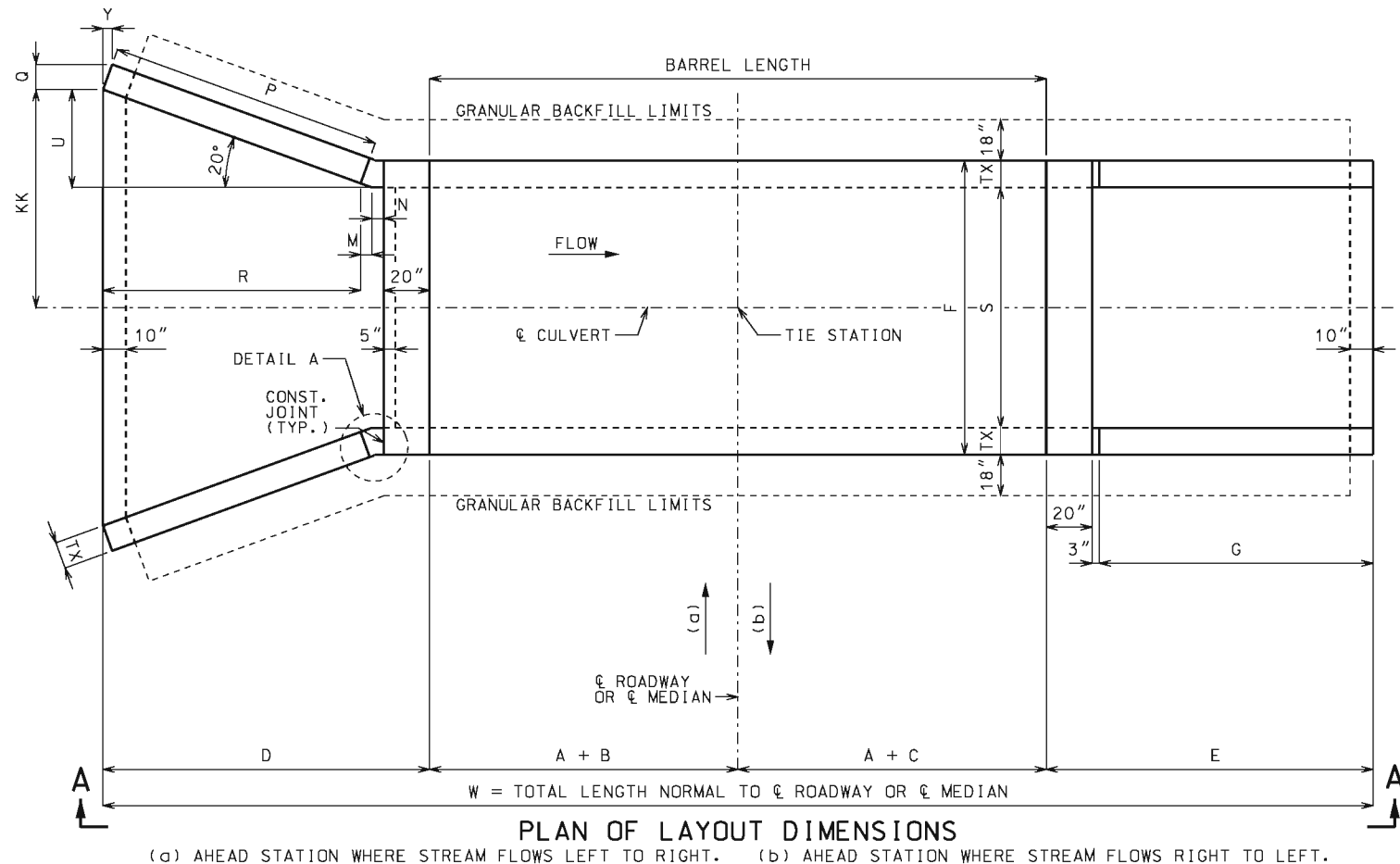
DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".





CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



EQUATIONS FOR COMPUTING α , β , B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W} \right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO ϕ RDWY. FILL + A(CS) - A(TAN α)
UPSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO ϕ RDWY. FILL + A(CS) + A(TAN α)
DOWNSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ϕ ROADWAY OR ϕ MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ϕ ROADWAY OR ϕ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ϕ ROADWAY OR ϕ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ϕ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ϕ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

| VARIABLE | DIMENSION | VARIABLE | DIMENSION |
|----------|------------------|----------|--------------------------|
| α | SEE EQUATIONS | P | 2V(SEC 20°) |
| β | SEE EQUATIONS | Q | TX(COS 20°) |
| B | SEE EQUATIONS | R | P(COS 20°) |
| C | SEE EQUATIONS | U | (R + M)(TAN 20°) |
| D | R + M + N + 20" | V | HT + TS - 12" |
| E | G + 23" | W | 2A + B + C + D + E |
| F | S + 2TX | Y | TX(SIN 20°) |
| G | 2V | KK | S/2 + U |
| M | N(COS 20°) | TW | MAX{3'-4" OR (BS + 12")} |
| N | 3" + TX(TAN 10°) | | |

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)


DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) f'_c = 4,000 PSI
REINFORCING STEEL (GRADE 60) f_y = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE SINGLE BOX CULVERT

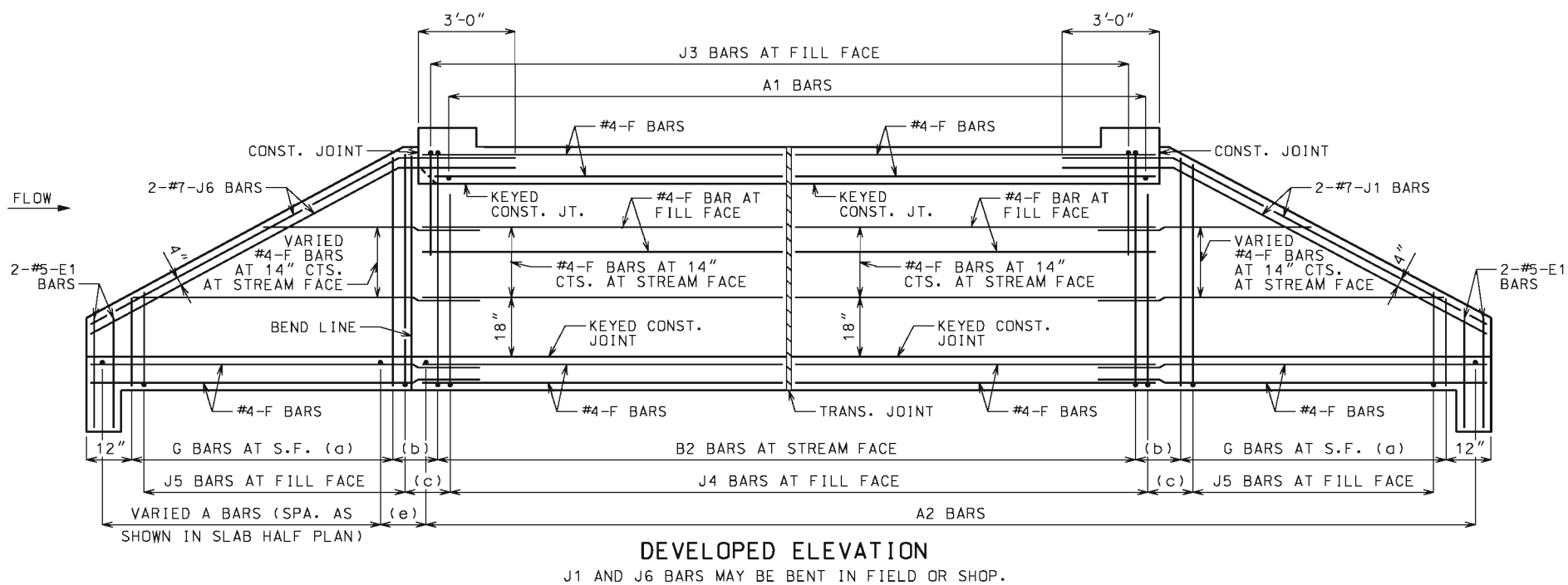
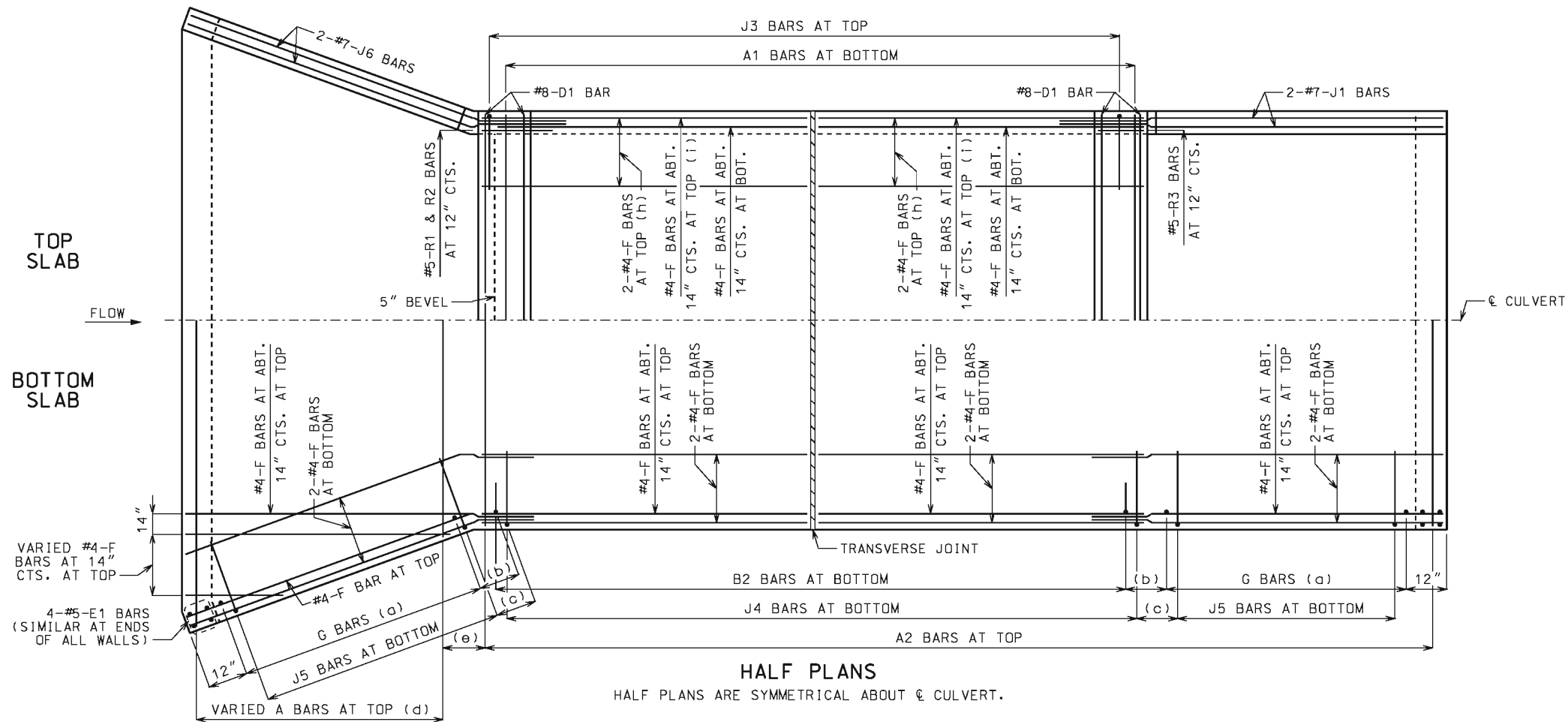
SKEW: SQUARED
WINGS: FLARED

LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

703.11J

SHEET NO.
1 OF 3



LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS B2 BARS



(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"

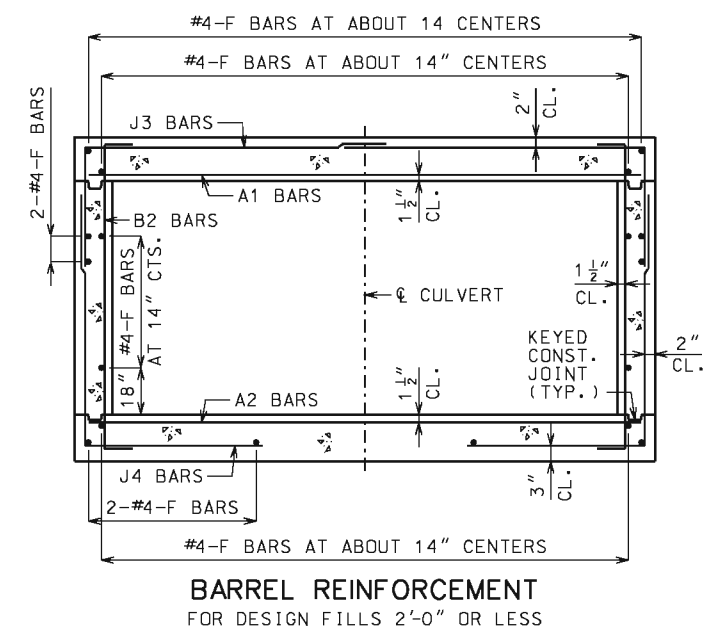
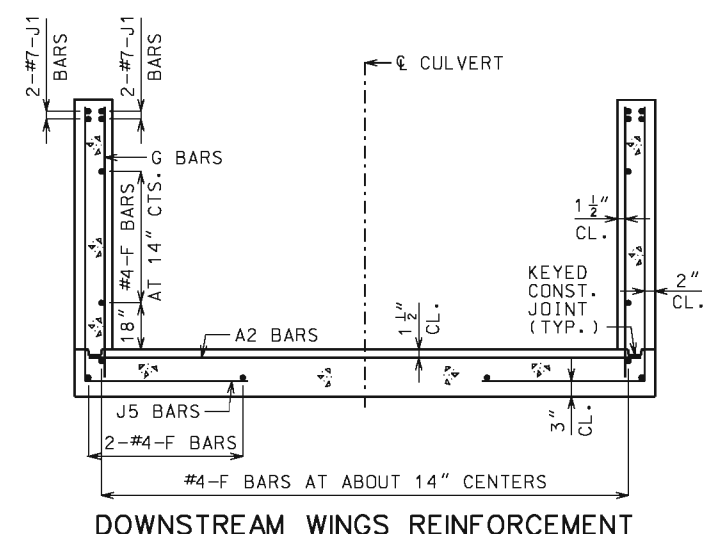
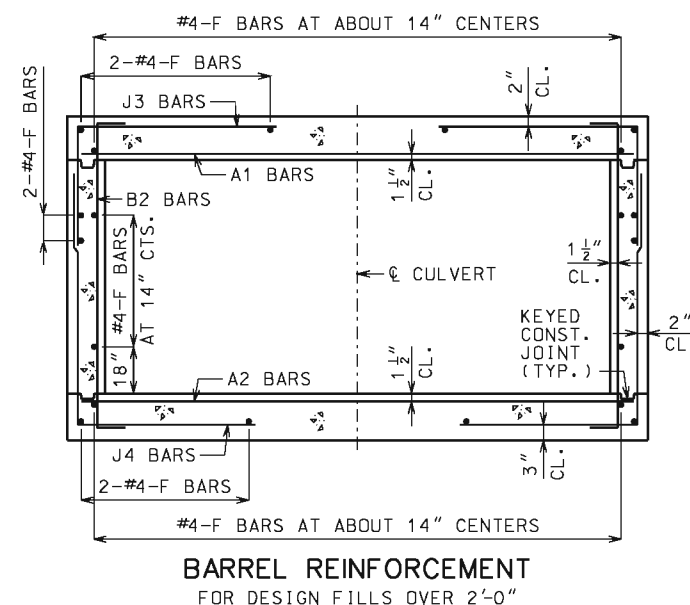
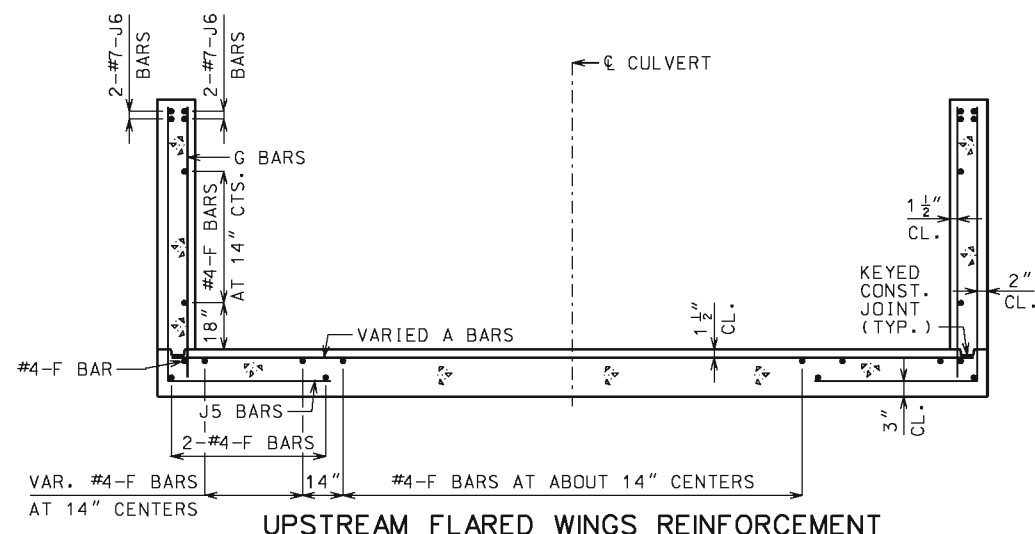
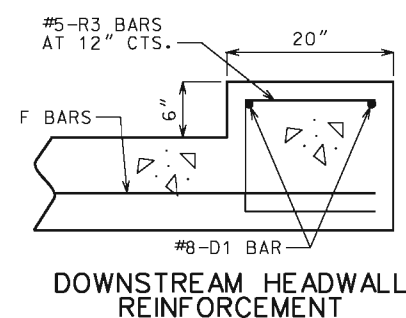
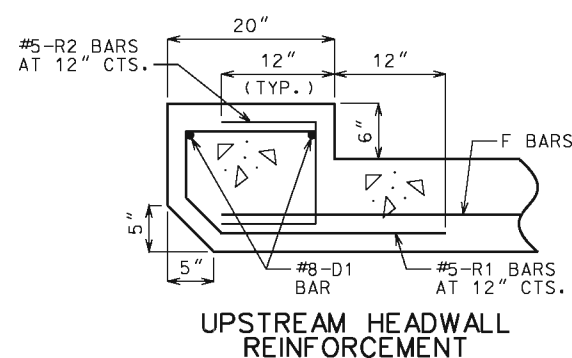
(i) FOR DESIGN FILLS 2'-0" OR LESS

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE SINGLE BOX CULVERT SKEW: SQUARED WINGS: FLARED REINFORCEMENT |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.11J SHEET NO. 2 OF 3 |



PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



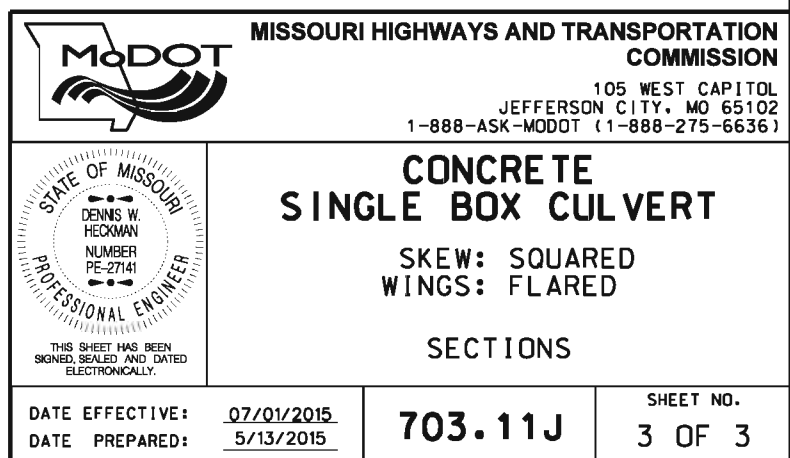
GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

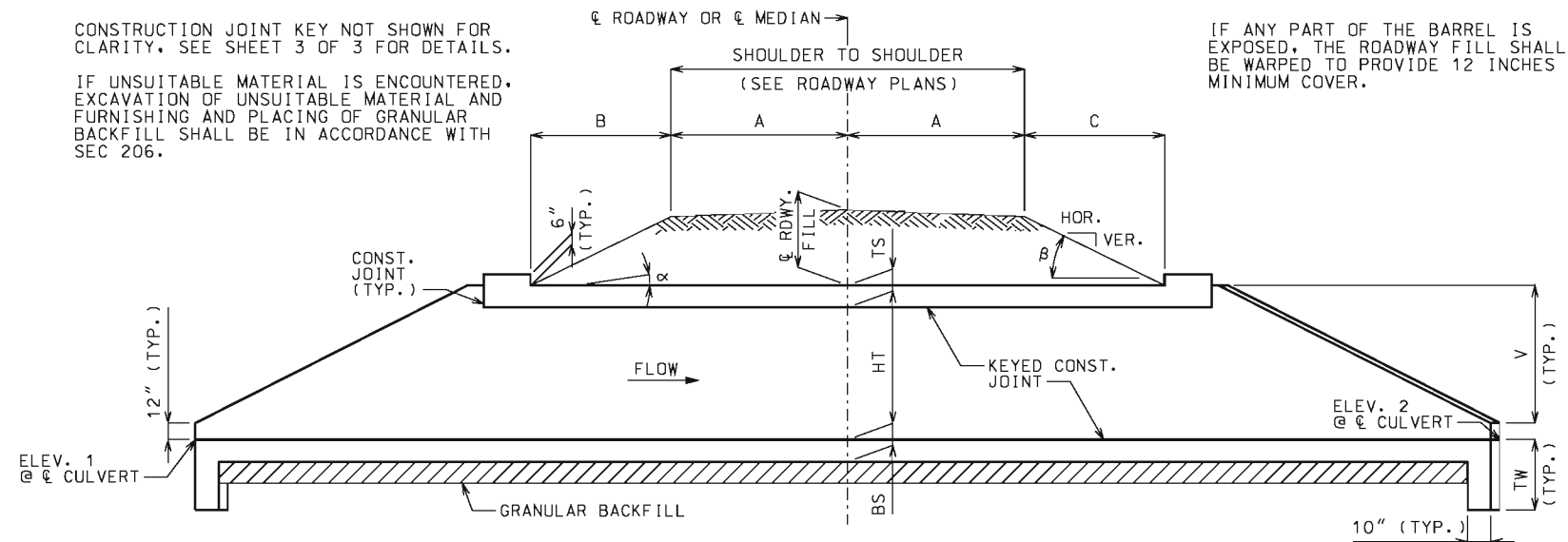
MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".



CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY. SEE SHEET 3 OF 3 FOR DETAILS.

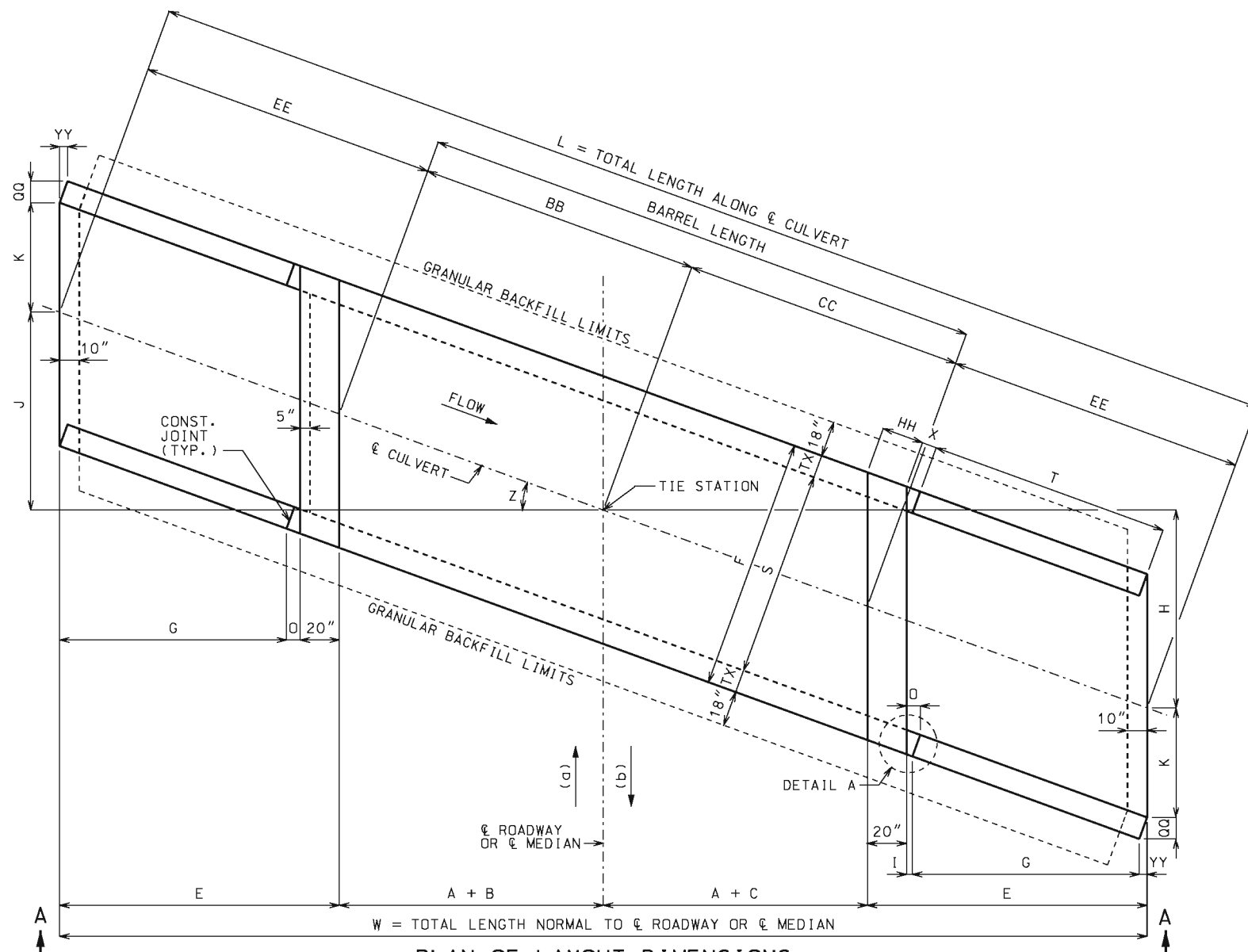
IF UNSUITABLE MATERIAL IS ENCOUNTERED, EXCAVATION OF UNSUITABLE MATERIAL AND FURNISHING AND PLACING OF GRANULAR BACKFILL SHALL BE IN ACCORDANCE WITH SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



GENERAL ELEVATION A-A

CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



PLAN OF LAYOUT DIMENSIONS

(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING α , β , B AND C

$$\alpha = \text{ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO } \text{CL ROADWAY OR CL MEDIAN} = \arctan\left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W}\right)$$

$$\beta = \text{ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO } \text{CL ROADWAY OR CL MEDIAN} = \arctan\left(\frac{\text{VER.}}{\text{HOR.}}\right)$$

$$B = \text{HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO } \text{CL ROADWAY OR CL MEDIAN} = \frac{\text{CL RDWY. FILL} + A(\text{CS}) - A(\text{TAN } \alpha)}{\text{TAN } \beta + \text{TAN } \alpha}$$

$$C = \text{HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO } \text{CL ROADWAY OR CL MEDIAN} = \frac{\text{CL RDWY. FILL} + A(\text{CS}) + A(\text{TAN } \alpha)}{\text{TAN } \beta - \text{TAN } \alpha}$$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM CL ROADWAY OR CL MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN CL ROADWAY OR CL MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO CL ROADWAY OR CL MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE CL ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, CL ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

| VARIABLE | DIMENSION | VARIABLE | DIMENSION |
|----------|--------------------|----------|--------------------------|
| α | SEE EQUATIONS | T | G(SEC Z) |
| β | SEE EQUATIONS | V | HT + TS - 12" |
| B | SEE EQUATIONS | W | 2A + B + C + 2E |
| C | SEE EQUATIONS | X | 3" + TX(TAN Z) |
| E | G + O + 20" | Z | SKEW ANGLE |
| F | S + 2TX | BB | (A + B)(SEC Z) |
| G | 2V | CC | (A + C)(SEC Z) |
| H | (A + C + E)(TAN Z) | EE | E(SEC Z) |
| I | 3"(COS Z) | HH | 20"(SEC Z) |
| J | (A + B + E)(TAN Z) | OO | TX(COS Z) |
| K | S(SEC Z)/2 | YY | TX(SIN Z) |
| L | 2EE + BB + CC | TW | MAX{3'-4" OR (BS + 12")} |
| O | I + YY | | |

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD. EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

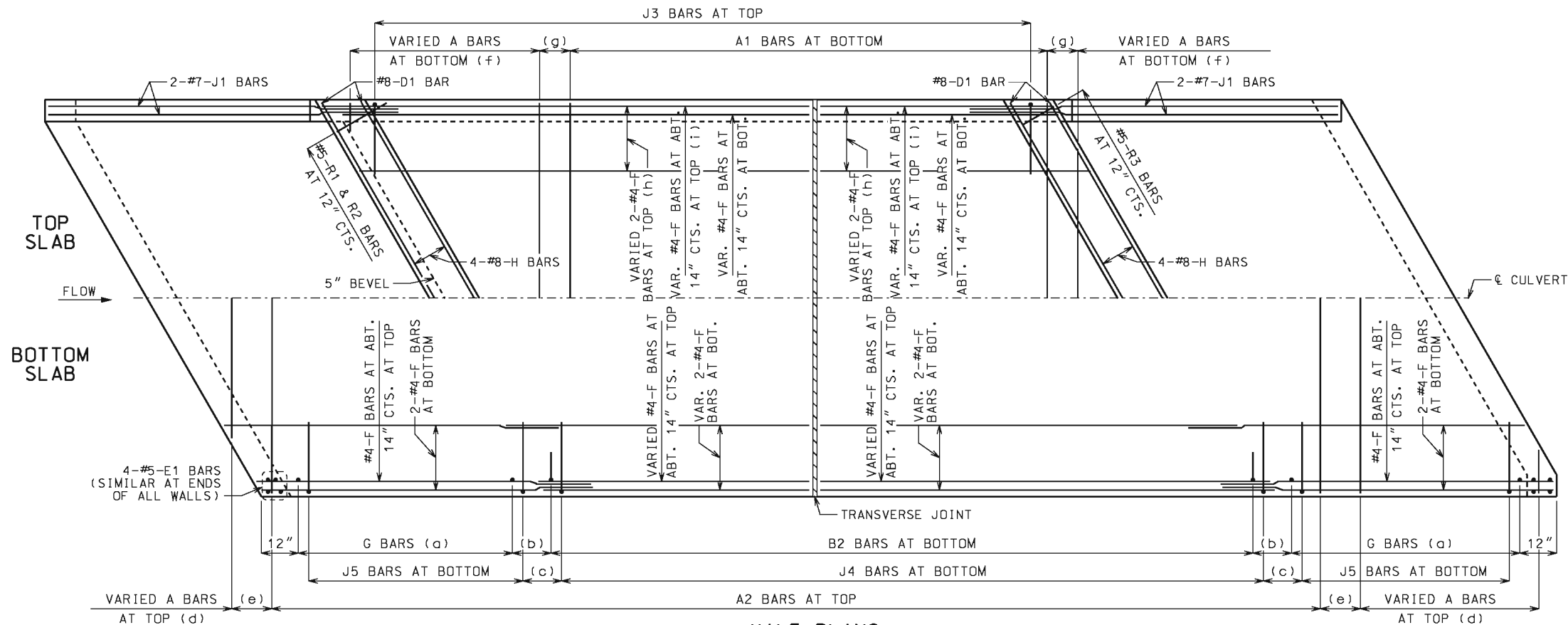
MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

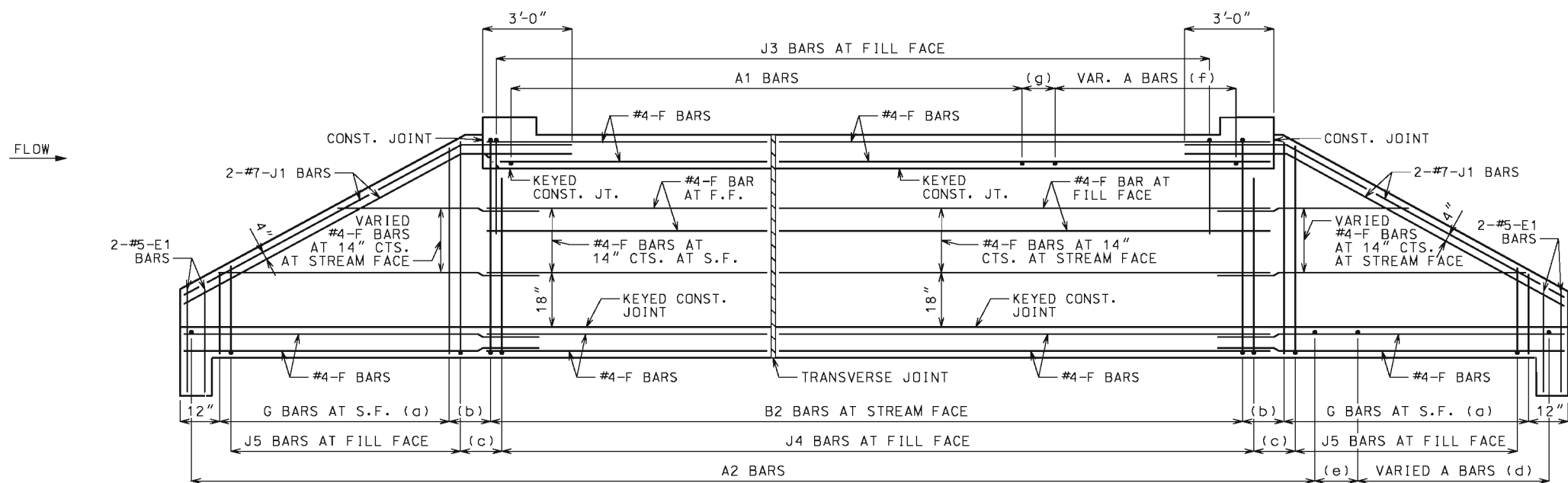
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.

| | |
|--|------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| CONCRETE SINGLE BOX CULVERT | |
| SKEW: LEFT ADVANCE WINGS: STRAIGHT | |
| LAYOUT | |
| DATE EFFECTIVE: 07/01/2015 DATE PREPARED: 5/13/2015 | SHEET NO. 1 OF 3 |



HALF PLANS
HALF PLANS ARE SYMMETRICAL ABOUT ϕ CULVERT.



ELEVATION
J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS


(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

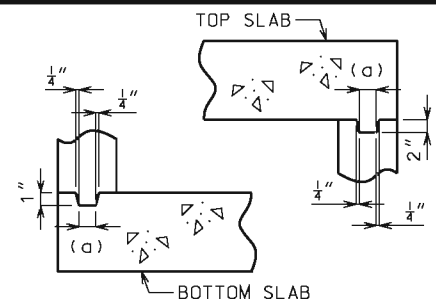
(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

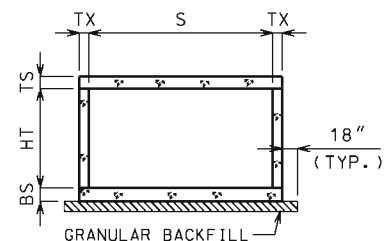
(i) FOR DESIGN FILLS 2'-0" OR LESS

| | |
|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| CONCRETE SINGLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: STRAIGHT | |
| REINFORCEMENT | |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.12J |
| SHEET NO. 2 OF 3 | |

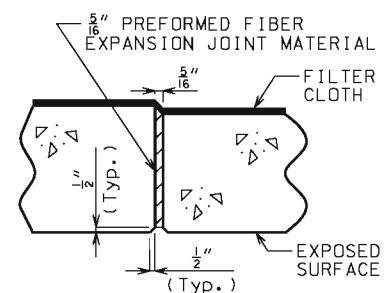
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



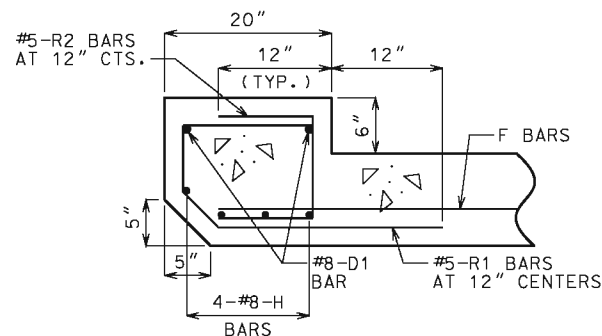
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



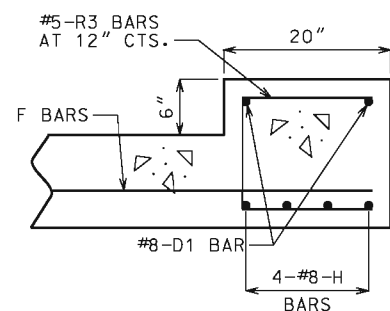
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

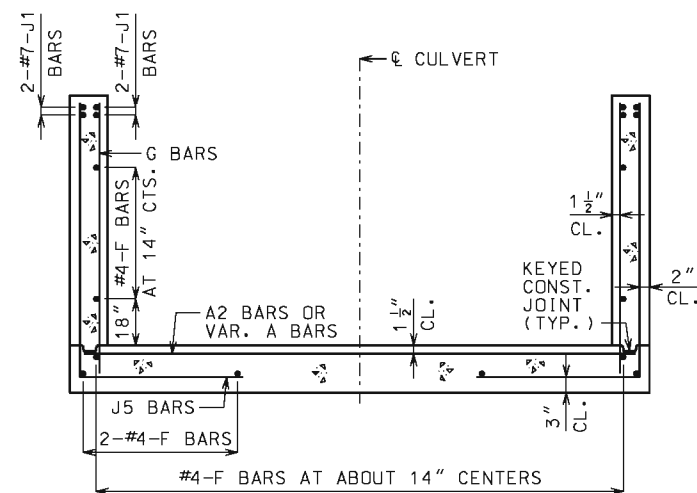
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



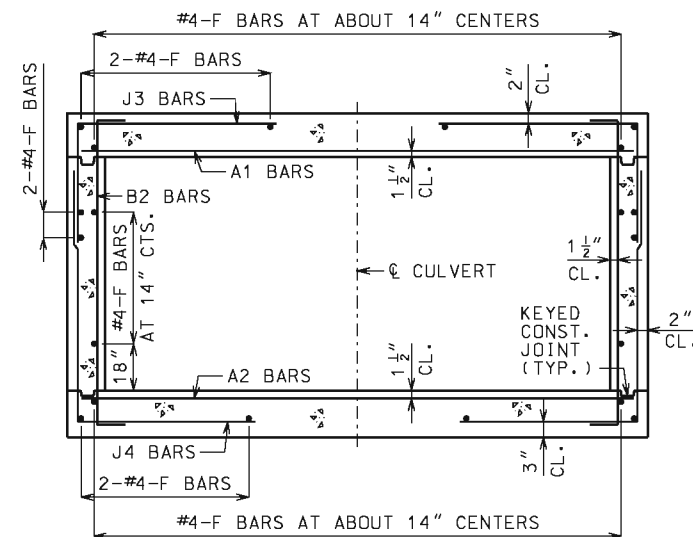
UPSTREAM HEADWALL REINFORCEMENT



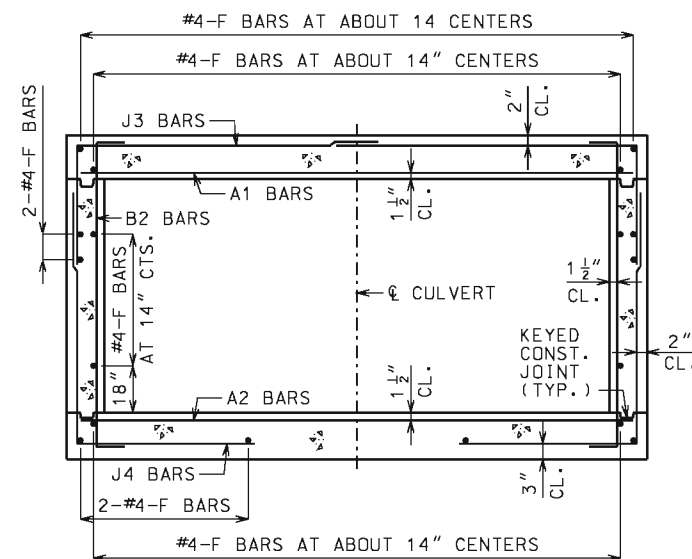
DOWNSTREAM HEADWALL REINFORCEMENT



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS


GENERAL NOTES:

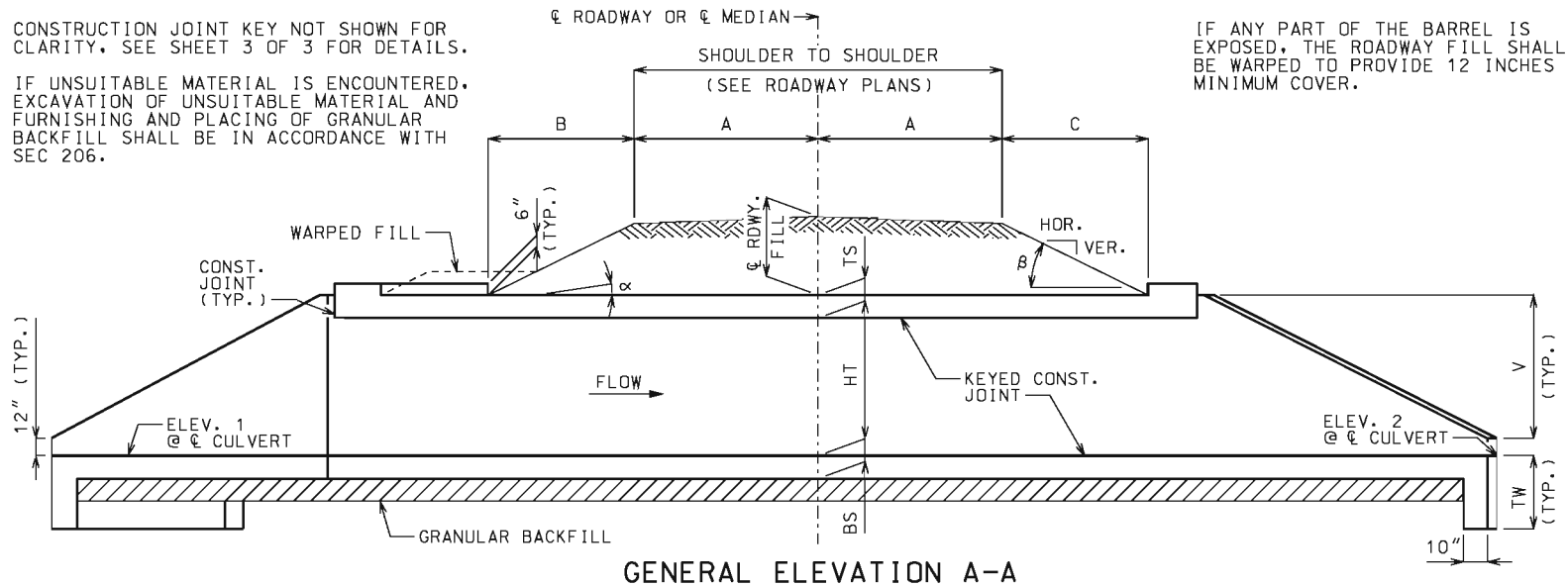
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

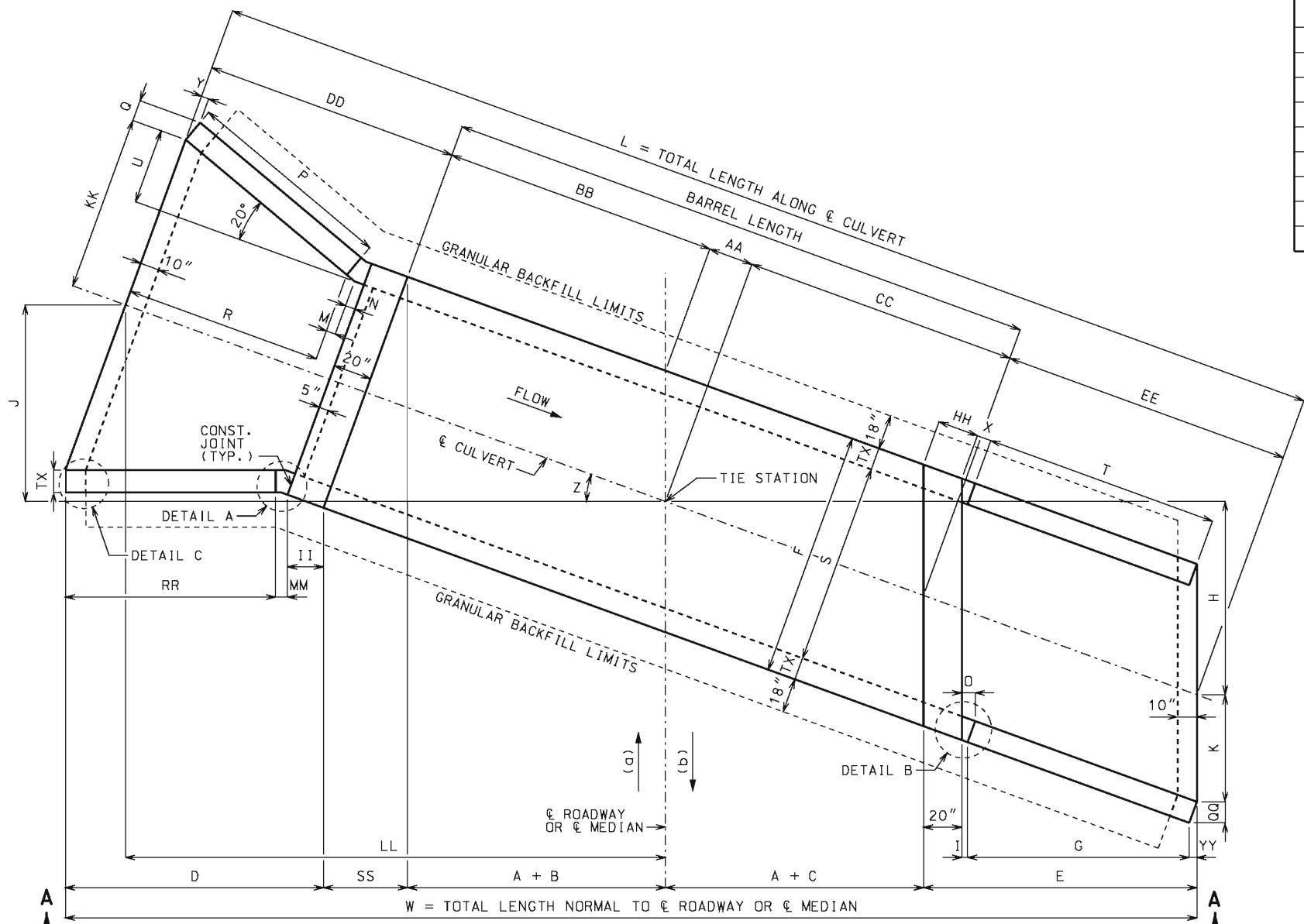
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

| | |
|---|----------------|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>CONCRETE SINGLE BOX CULVERT</p> <p>SKEW: LEFT ADVANCE WINGS: STRAIGHT</p> <p>SECTIONS</p> | |
| <p>DATE EFFECTIVE: 07/01/2015</p> <p>DATE PREPARED: 5/13/2015</p> | <p>703.12J</p> |
| <p>SHEET NO. 3 OF 3</p> | |



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING α , β , B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{LL + A + C + E} \right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = ϕ RDWY. FILL + $A(CS) - A(\tan \alpha)$
UPSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN
 $\tan \beta + \tan \alpha$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO = ϕ RDWY. FILL + $A(CS) + A(\tan \alpha)$
DOWNSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN
 $\tan \beta - \tan \alpha$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ϕ ROADWAY OR ϕ MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ϕ ROADWAY OR ϕ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ϕ ROADWAY OR ϕ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ϕ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ϕ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

| VARIABLE | DIMENSION | VARIABLE | DIMENSION | VARIABLE | DIMENSION |
|----------|----------------------------|----------|-------------------------|----------|--------------------------|
| α | SEE EQUATIONS | N | 3" + TX(TAN 10°) | CC | (A + C)(SEC Z) |
| β | SEE EQUATIONS | O | I + YY | DD | R + M + N + 20" |
| B | SEE EQUATIONS | P | 2V[SEC(Z + 20°)] | EE | E(SEC Z) |
| C | SEE EQUATIONS | Q | TX(COS 20°) | HH | 20"(SEC Z) |
| D | Z \geq 20°: II + MM + RR | R | P(COS 20°) | II | 20"(COS Z) |
| | Z < 20°: II + MM + RR + TT | T | G(SEC Z) | KK | S/2 + U |
| E | G + O + 20" | U | (R + M)(TAN 20°) | LL | (AA + BB + DD)(COS Z) |
| F | S + 2TX | V | HT + TS - 12" | MM | 3"[COS Z + COS(Z - 20°)] |
| G | 2V | W | 2A + B + C + D + E + SS | QQ | TX(COS Z) |
| H | (A + C + E)(TAN Z) | X | 3" + TX(TAN Z) | RR | P[COS(Z - 20°)] |
| I | 3"(COS Z) | Y | TX(SIN 20°) | SS | F(SIN Z) |
| J | (AA + BB + DD)(SIN Z) | Z | SKEW ANGLE | TT | TX[SIN(20° - Z)] |
| K | S(SEC Z)/2 | AA | F(TAN Z)/2 | YY | TX(SIN Z) |
| L | AA + BB + CC + DD + EE | BB | (A + B)(SEC Z) | TW | MAX{3'-4" OR (BS + 12")} |
| M | N(COS 20°) | | | | |

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

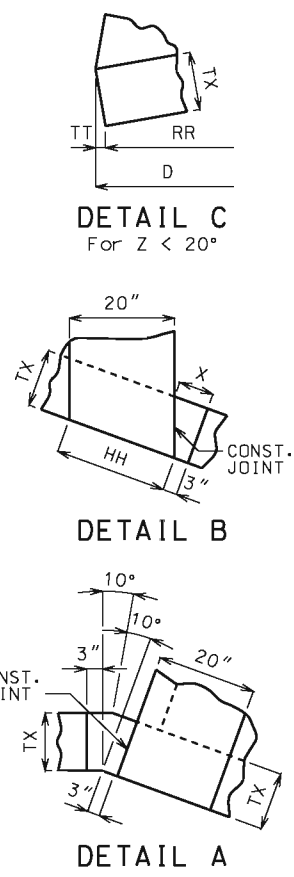
DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) f'_c = 4,000 PSI
REINFORCING STEEL (GRADE 60) f_y = 60,000 PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

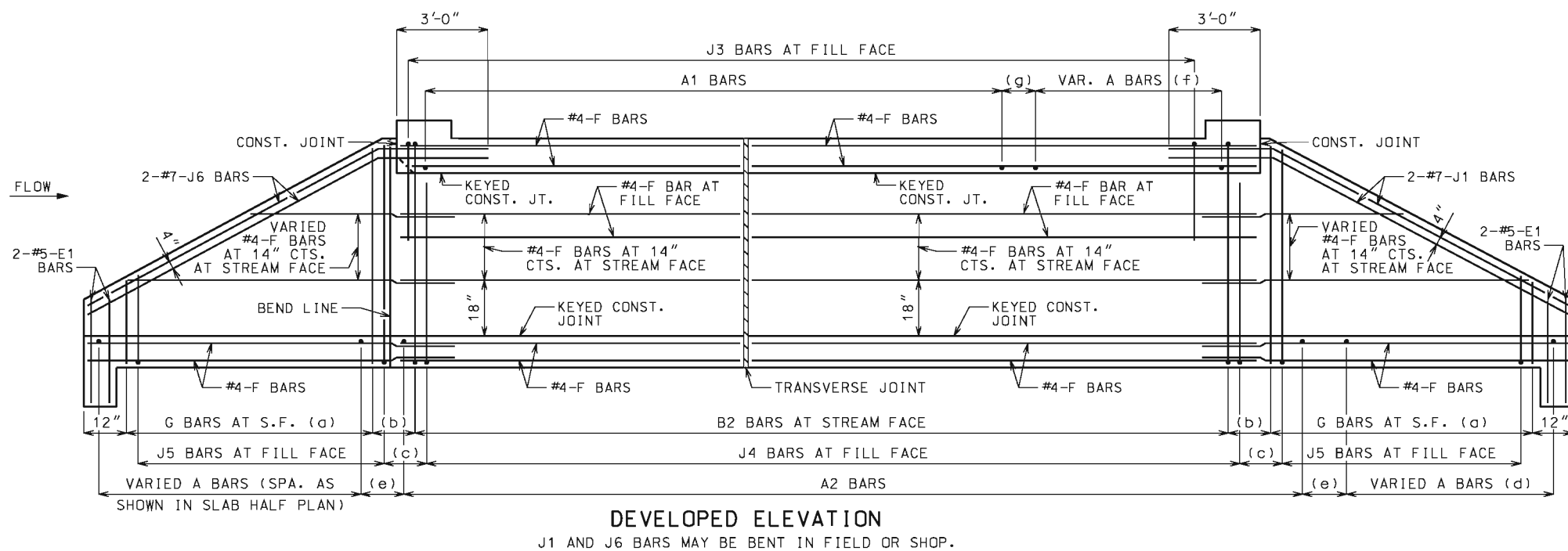
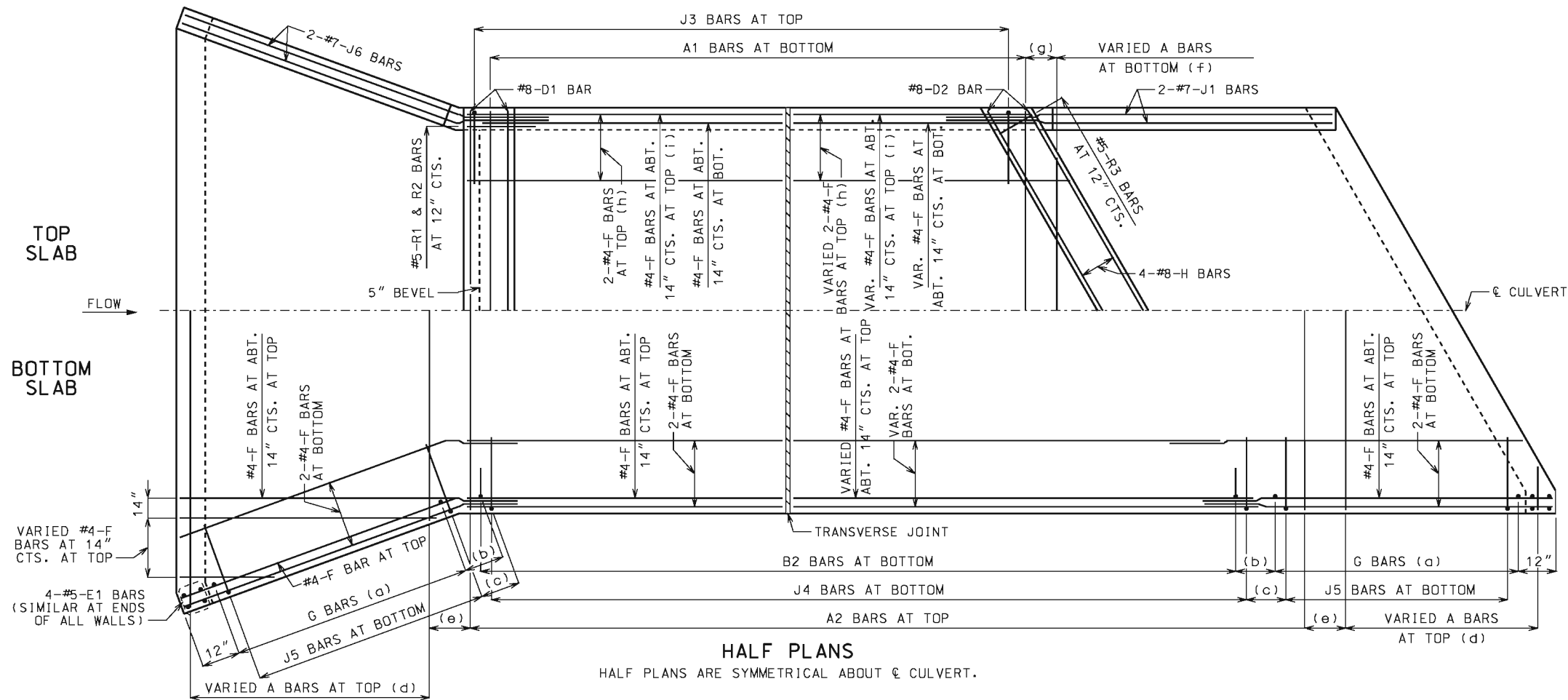
CONCRETE SINGLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 5/13/2015

SHEET NO. 1 OF 3



LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS



(e) A2 BAR SPACING

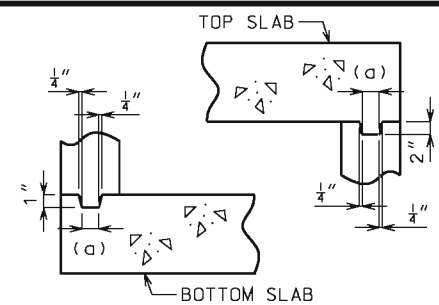
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

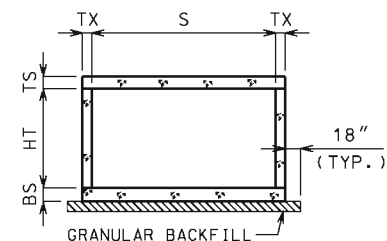
(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

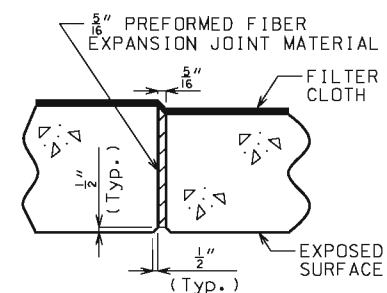
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE SINGLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: FLARED REINFORCEMENT |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.13J |
| SHEET NO. 2 OF 3 | |



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



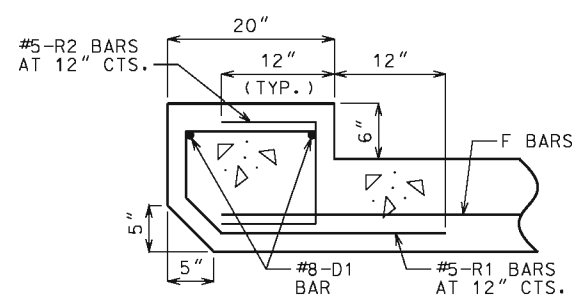
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



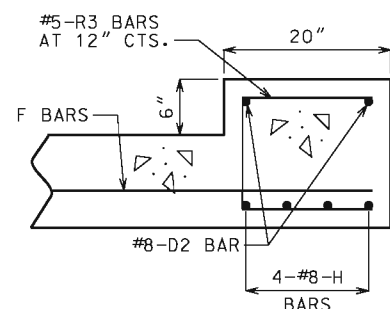
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

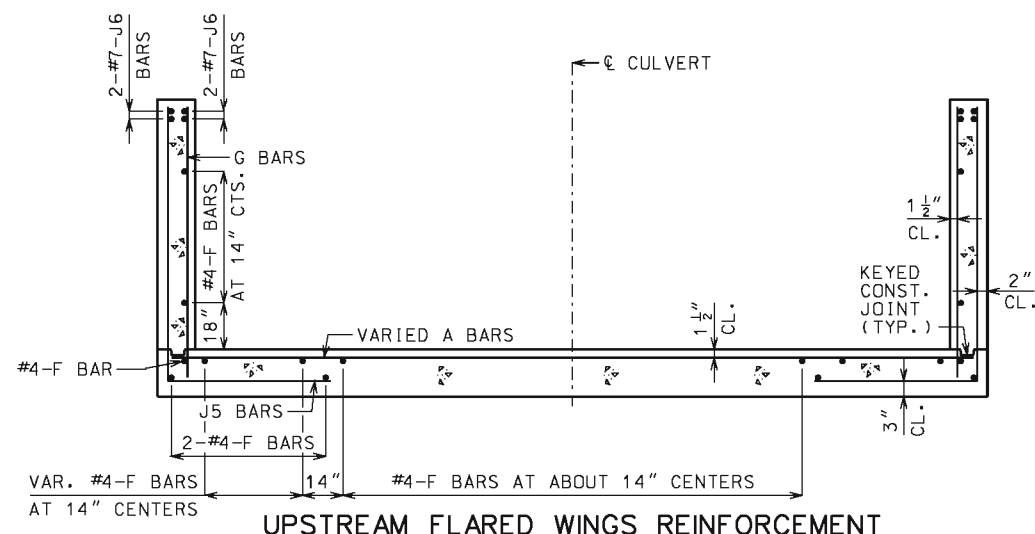
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



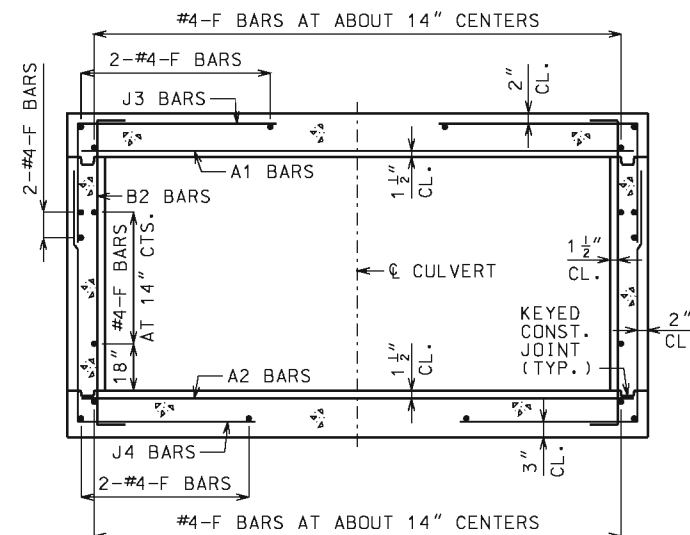
UPSTREAM HEADWALL REINFORCEMENT



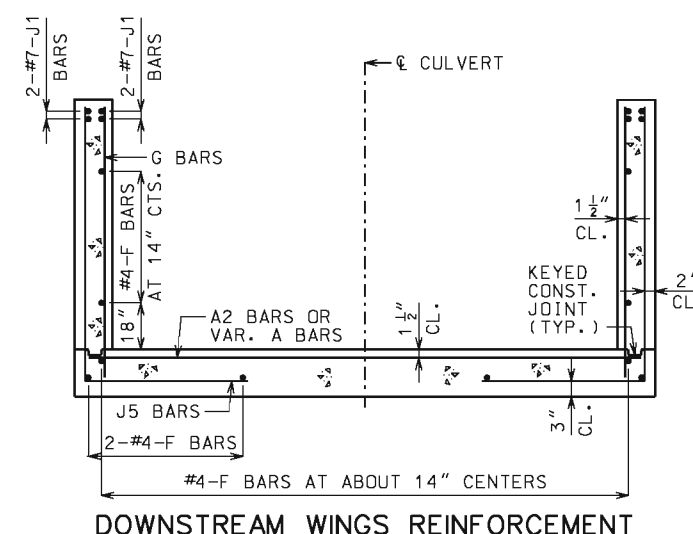
DOWNSTREAM HEADWALL REINFORCEMENT



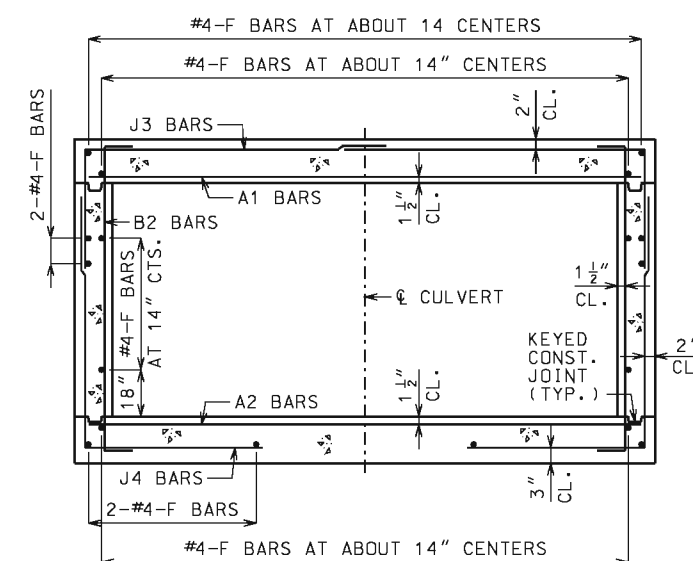
UPSTREAM FLARED WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS


GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

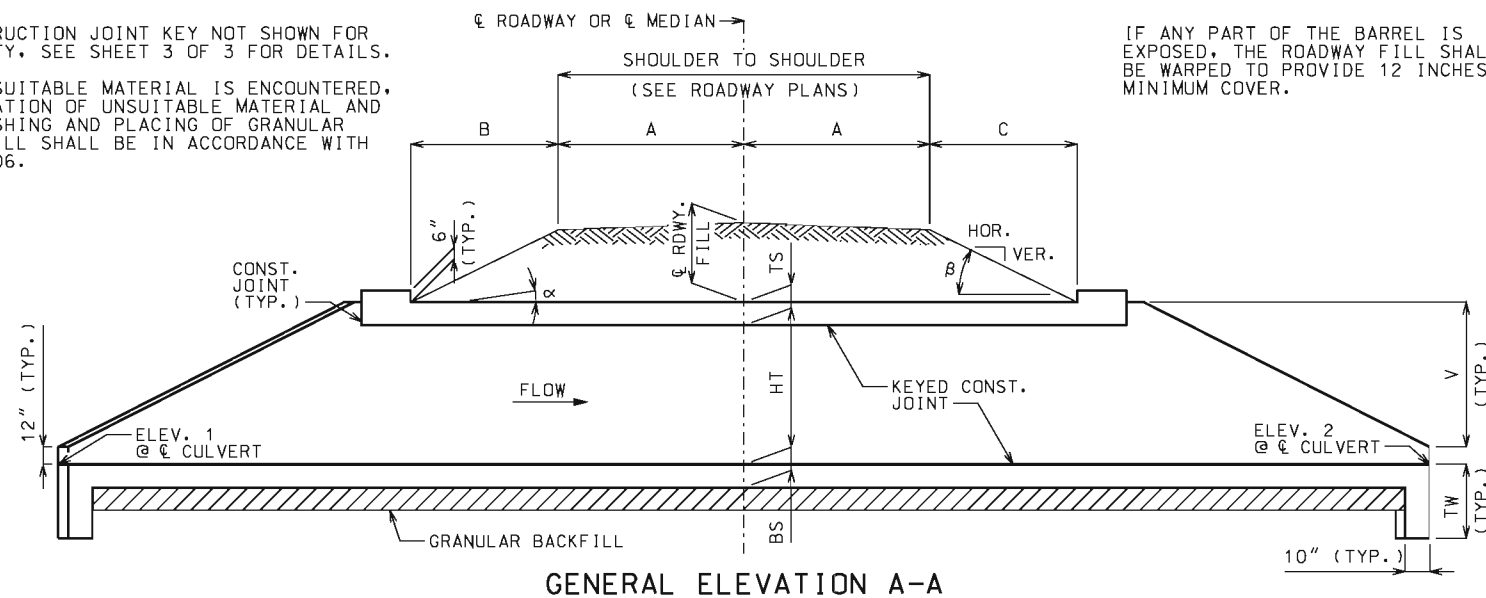
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 inch.

| | |
|---|--|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>CONCRETE SINGLE BOX CULVERT</p> <p>SKEW: LEFT ADVANCE WINGS: FLARED</p> <p>SECTIONS</p> | |
| <p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>DATE EFFECTIVE: 07/01/2015 DATE PREPARED: 5/13/2015</p> |
| <p>703.13J</p> | <p>SHEET NO. 3 OF 3</p> |

IF UNSUITABLE MATERIAL IS ENCOUNTERED,
EXCAVATION OF UNSUITABLE MATERIAL AND
BURNISHING AND PLACING OF GRANULAR
BACKFILL SHALL BE IN ACCORDANCE WITH
SEC 206.

IF ANY PART OF THE BARREL IS EXPOSED, THE ROADWAY FILL SHALL BE WARPED TO PROVIDE 12 INCHES MINIMUM COVER.



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.

EQUATIONS FOR COMPUTING α , β , B AND C

$$\alpha = \text{ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO } \ell \text{ ROADWAY OR } \ell \text{ MEDIAN} = \text{ARCTAN} \left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{W} \right)$$

$$\beta = \text{ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO } \text{C ROADWAY OR C MEDIAN} = \text{ARCTAN} \left(\frac{\text{VER.}}{\text{HOR.}} \right)$$

$$B = \text{HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO } \frac{C \text{ RDWY. FILL} + A(CS) - A(\tan\alpha)}{\tan\beta + \tan\alpha}$$

$$C = \text{HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO} = \frac{C \text{ RDWY. FILL} + A(CS) + A(\tan \alpha)}{\tan \beta - \tan \alpha}$$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ϕ ROADWAY OR ϕ MEDIAN.

THE TERM "A(CS)" IS THE DIFFERENCE IN ELEVATION BETWEEN ϕ ROADWAY OR ϕ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ϕ ROADWAY OR ϕ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE C ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, & ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

| LAYOUT DIMENSIONS | | | |
|-------------------|--------------------|----------|----------------------------|
| VARIABLE | DIMENSION | VARIABLE | DIMENSION |
| α | SEE EQUATIONS | T | G(SEC Z) |
| β | SEE EQUATIONS | V | HT + TS - 12" |
| B | SEE EQUATIONS | W | 2A + B + C + 2E |
| C | SEE EQUATIONS | X | 3" + TX(TAN Z) |
| E | G + O + 20" | Z | SKEW ANGLE |
| F | S + 2TX | BB | (A + B)(SEC Z) |
| G | 2V | CC | (A + C)(SEC Z) |
| H | (A + C + E)(TAN Z) | EE | E(SEC Z) |
| I | 3"(COS Z) | HH | 20"(SEC Z) |
| J | (A + B + E)(TAN Z) | OO | TX(COS Z) |
| K | S(SEC Z)/2 | YY | TX(SIN Z) |
| L | 2EE + BB + CC | TW | MAX{3' - 4" OR (BS + 12")} |
| O | I + YY | | |

GENERAL NOTES:

DESIGN SPECIFICATIONS:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM
REVISIONS

DESIGN LOADING:

VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES:

CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

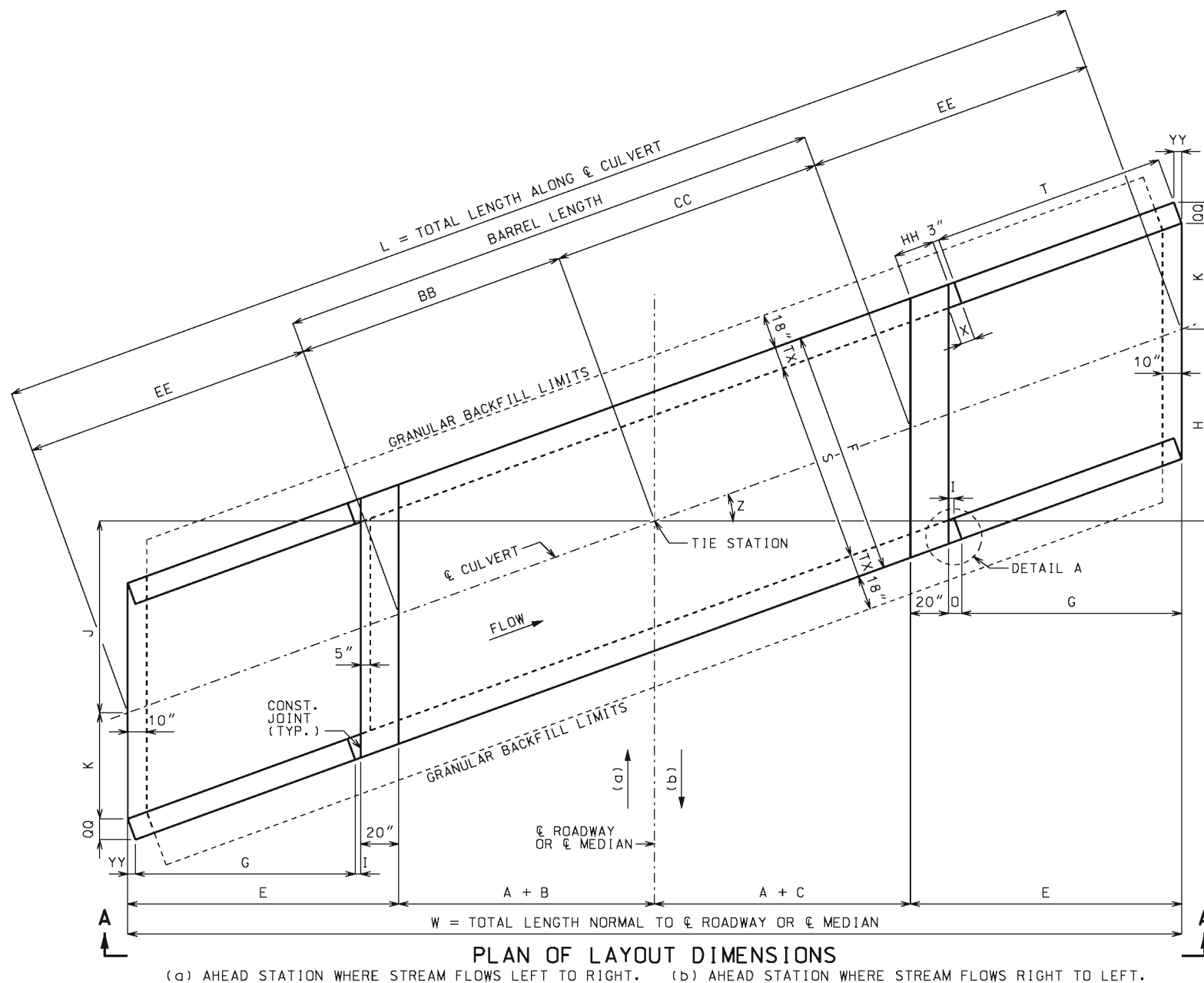
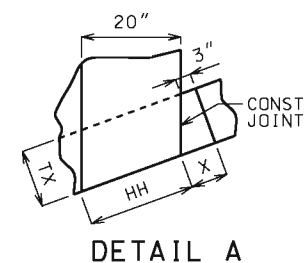
MISCELLANEOUS:


FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION
DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



| | |
|---|--|
|  | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) |
|---|--|

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.



GENERAL NOTES:

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS


(q) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS



J1 BARS MAY BE BENT IN FIELD OR SHOP.



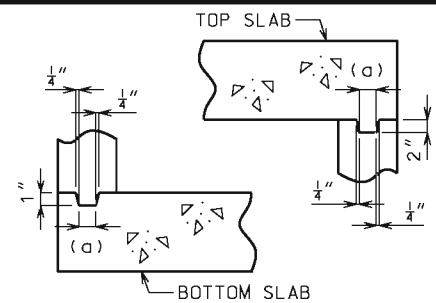
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY

SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

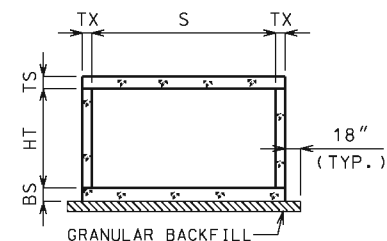
REINFORCEMENT

703.14J

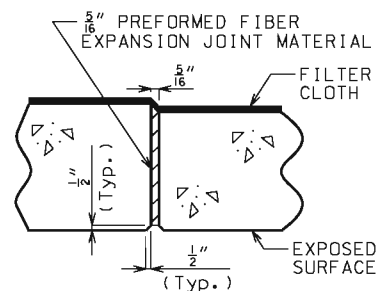
SHEET NO.
2 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



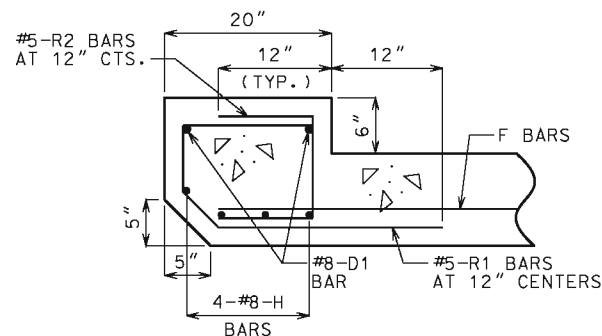
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



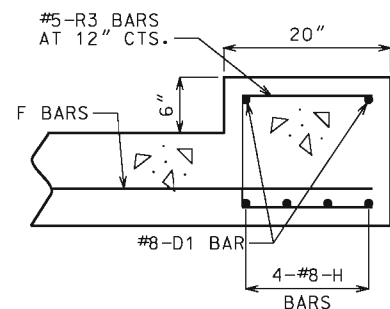
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

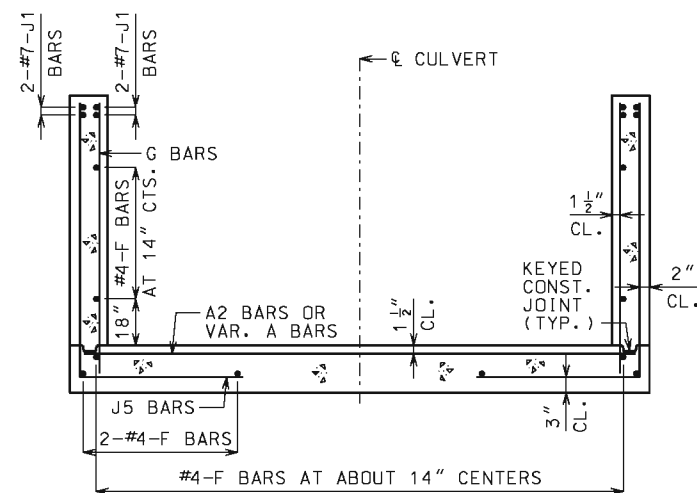
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



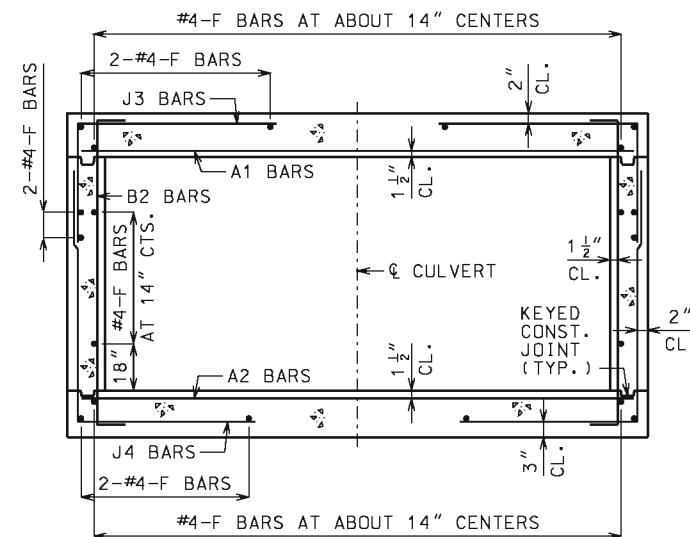
UPSTREAM HEADWALL REINFORCEMENT



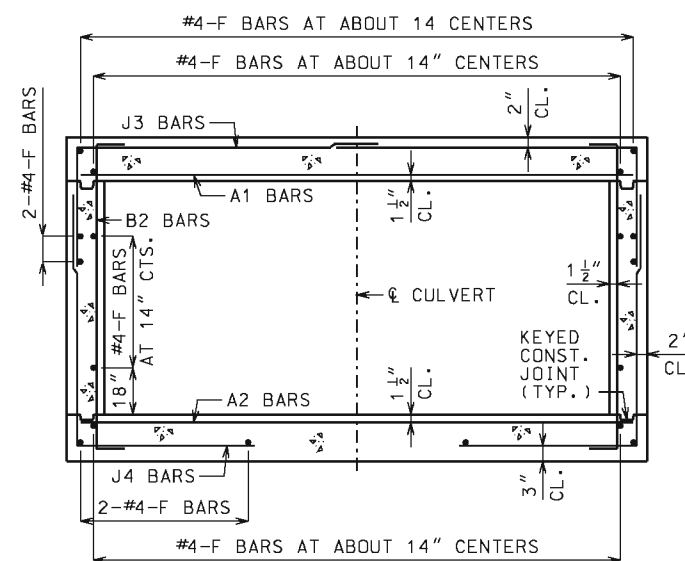
DOWNSTREAM HEADWALL REINFORCEMENT



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS


GENERAL NOTES:

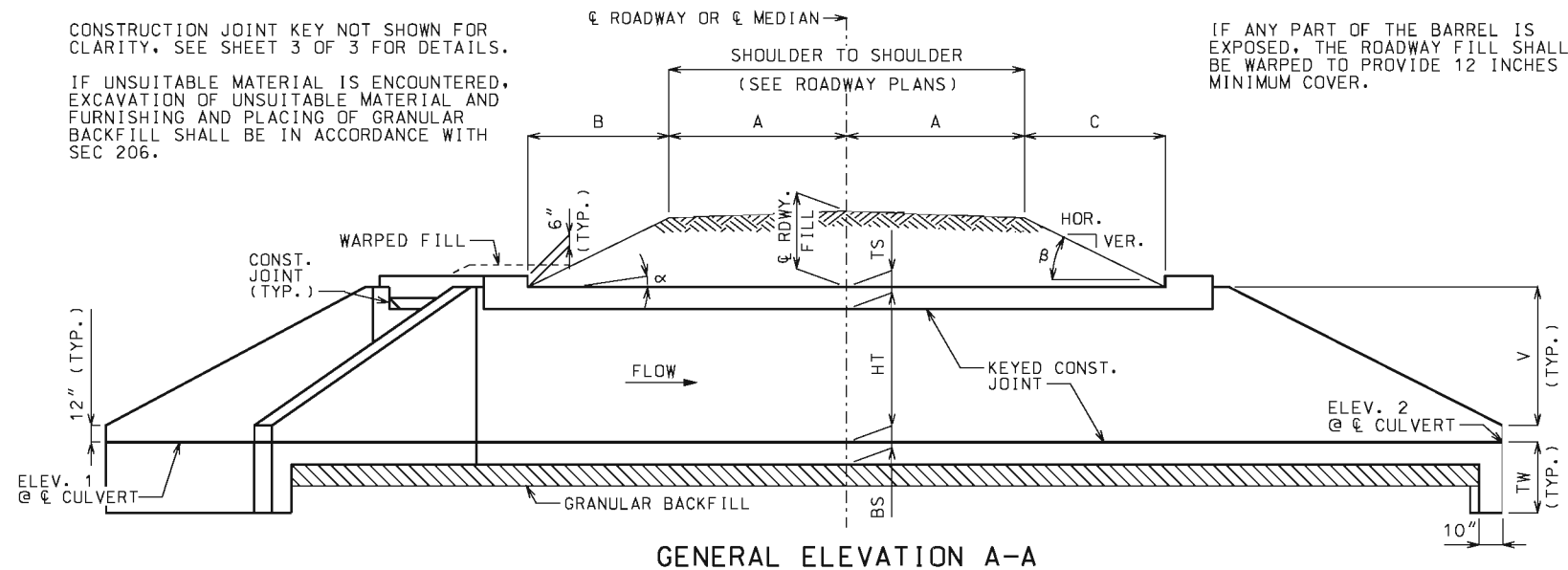
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

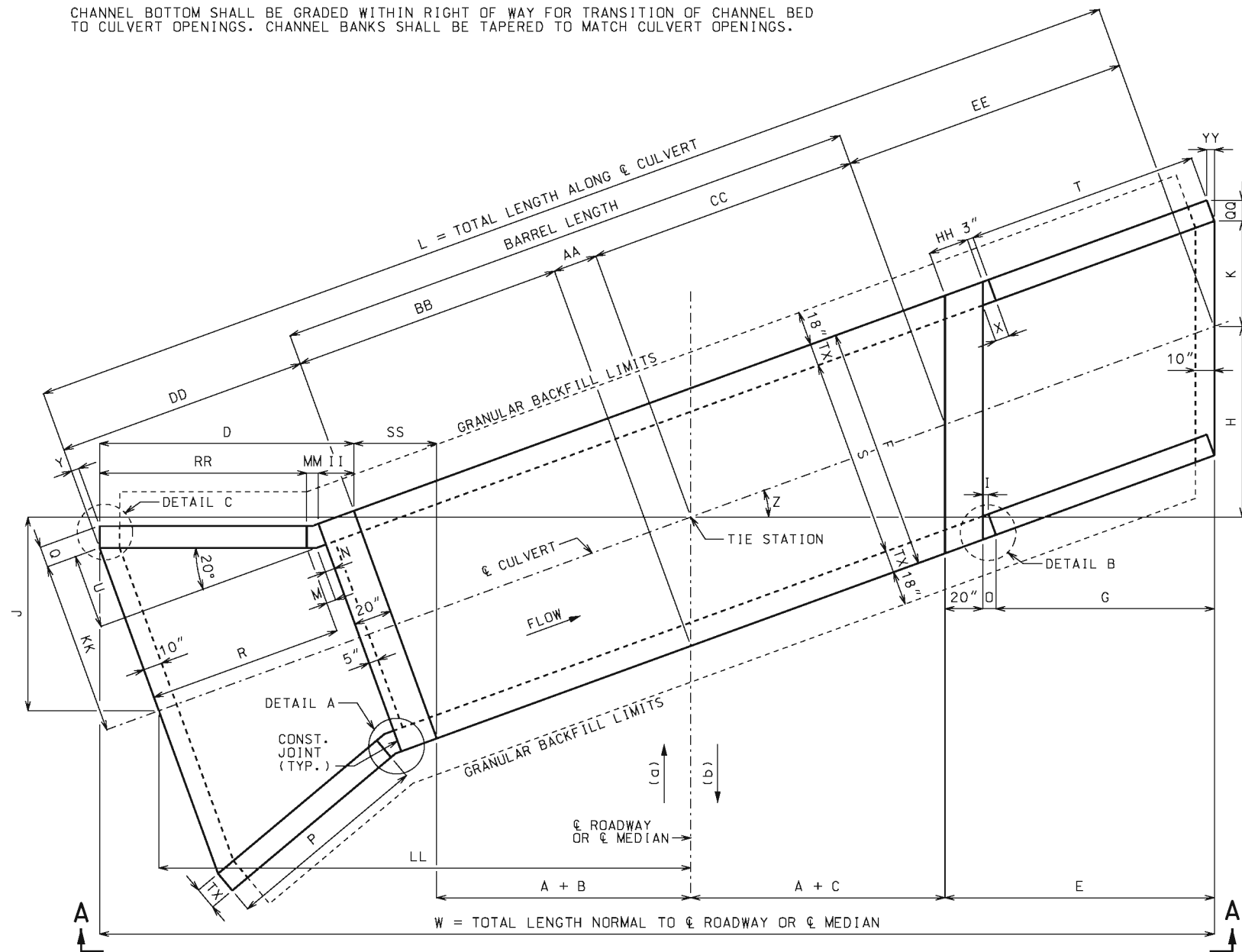
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

| | |
|---|----------------|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>CONCRETE SINGLE BOX CULVERT</p> <p>SKEW: RIGHT ADVANCE WINGS: STRAIGHT</p> <p>SECTIONS</p> | |
| <p>DATE EFFECTIVE: 07/01/2015</p> <p>DATE PREPARED: 5/13/2015</p> | <p>703.14J</p> |
| <p>SHEET NO. 3 OF 3</p> | |



CHANNEL BOTTOM SHALL BE GRADED WITHIN RIGHT OF WAY FOR TRANSITION OF CHANNEL BED TO CULVERT OPENINGS. CHANNEL BANKS SHALL BE TAPERED TO MATCH CULVERT OPENINGS.



(a) AHEAD STATION WHERE STREAM FLOWS LEFT TO RIGHT. (b) AHEAD STATION WHERE STREAM FLOWS RIGHT TO LEFT.

EQUATIONS FOR COMPUTING α , β , B AND C

α = ANGLE OF BARREL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{ELEV. 1} - \text{ELEV. 2}}{A + C + E + LL} \right)$

β = ANGLE OF FILL SLOPE WITH HORIZONTAL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN = $\text{ARCTAN} \left(\frac{\text{VER.}}{\text{HOR.}} \right)$

B = HORIZONTAL DISTANCE FROM UPSTREAM EDGE OF SHOULDER TO = ϕ RDWY. FILL + $A(\text{CS}) - A(\text{TAN} \alpha)$
UPSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN
 $\text{TAN} \beta + \text{TAN} \alpha$

C = HORIZONTAL DISTANCE FROM DOWNSTREAM EDGE OF SHOULDER TO = ϕ RDWY. FILL + $A(\text{CS}) + A(\text{TAN} \alpha)$
DOWNSTREAM HEADWALL NORMAL TO ϕ ROADWAY OR ϕ MEDIAN
 $\text{TAN} \beta - \text{TAN} \alpha$

CS = CROSS SLOPE OF EACH PART OF ROADWAY INCLUDING CROWN, LANES AND SHOULDERS. CS IS POSITIVE IF RISING AND NEGATIVE IF FALLING AWAY FROM ϕ ROADWAY OR ϕ MEDIAN.

THE TERM " $A(\text{CS})$ " IS THE DIFFERENCE IN ELEVATION BETWEEN ϕ ROADWAY OR ϕ MEDIAN AND THE TOP OF THE FILL SLOPE NORMAL TO ϕ ROADWAY OR ϕ MEDIAN. THIS TERM SHALL BE ADJUSTED FOR UNSYMMETRICAL AND NONSTANDARD ROADWAYS.

TO ACCOUNT FOR A VARYING PROFILE GRADE THE ϕ ROADWAY FILL SHALL BE BASED ON STATIONS THAT CORRESPOND TO THE CORNERS OF THE INSIDE FACE OF THE HEADWALLS THAT PRODUCE MAXIMUM VALUES FOR B AND C.

SEE ROADWAY PLANS FOR SLOPES, ϕ ROADWAY FILL AND ELEVATIONS 1 AND 2. ELEVATIONS 1 AND 2 CORRESPOND TO UPPER AND LOWER FLOW LINE ELEVATIONS AND MAY BE BELOW THE NATURAL STREAM BOTTOM DUE TO ENVIRONMENTAL REQUIREMENTS.

LAYOUT DIMENSIONS

| VARIABLE | DIMENSION | VARIABLE | DIMENSION | VARIABLE | DIMENSION |
|----------|-----------------------------------|----------|---|----------|---|
| α | SEE EQUATIONS | N | $3'' + \text{TX}(\text{TAN } 10^\circ)$ | CC | $(A + C)(\text{SEC } Z)$ |
| β | SEE EQUATIONS | O | $I + \text{YY}$ | DD | $R + M + N + 20''$ |
| B | SEE EQUATIONS | P | $2V[\text{SEC}(Z + 20^\circ)]$ | EE | $E(\text{SEC } Z)$ |
| C | SEE EQUATIONS | Q | $\text{TX}(\text{COS } 20^\circ)$ | HH | $20''(\text{SEC } Z)$ |
| D | $Z \geq 20^\circ: II + MM + RR$ | R | $P(\text{COS } 20^\circ)$ | II | $20''(\text{COS } Z)$ |
| | $Z < 20^\circ: II + MM + RR + TT$ | T | $G(\text{SEC } Z)$ | KK | $S/2 + U$ |
| E | $G + O + 20''$ | U | $(R + M)(\text{TAN } 20^\circ)$ | LL | $(AA + BB + DD)(\text{COS } Z)$ |
| F | $S + 2\text{TX}$ | V | $\text{HT} + \text{TS} - 12''$ | MM | $3''[\text{COS } Z + \text{COS}(Z - 20^\circ)]$ |
| G | $2V$ | W | $2A + B + C + D + E + \text{SS}$ | QQ | $\text{TX}(\text{COS } Z)$ |
| H | $(A + C + E)(\text{TAN } Z)$ | X | $3'' + \text{TX}(\text{TAN } Z)$ | RR | $P[\text{COS}(Z - 20^\circ)]$ |
| I | $3''(\text{COS } Z)$ | Y | $\text{TX}(\text{SIN } 20^\circ)$ | SS | $F(\text{SIN } Z)$ |
| J | $(AA + BB + DD)(\text{SIN } Z)$ | Z | SKEW ANGLE | TT | $\text{TX}[\text{SIN}(20^\circ - Z)]$ |
| K | $S(\text{SEC } Z)/2$ | AA | $F(\text{TAN } Z)/2$ | YY | $\text{TX}(\text{SIN } Z)$ |
| L | $AA + BB + CC + DD + EE$ | BB | $(A + B)(\text{SEC } Z)$ | TW | $\text{MAX}\{3'-4'' \text{ OR } (\text{BS} + 12'')\}$ |
| M | $N(\text{COS } 20^\circ)$ | | | | |

GENERAL NOTES:

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)


DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR REINFORCEMENT DETAILS, SEE SHEET 2 OF 3. FOR SECTION DETAILS, SEE SHEET 3 OF 3. FOR MEMBER THICKNESS, SEE 703.17.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.

WHEN ALTERNATE PRECAST CONCRETE BOX CULVERT SECTIONS ARE USED, THE MINIMUM DISTANCE FROM INSIDE FACE OF HEADWALLS TO PRECAST SECTIONS MEASURED ALONG THE SHORTEST WALL SHALL BE 3 FEET. REINFORCEMENT AND DIMENSIONS FOR WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE SINGLE BOX CULVERT

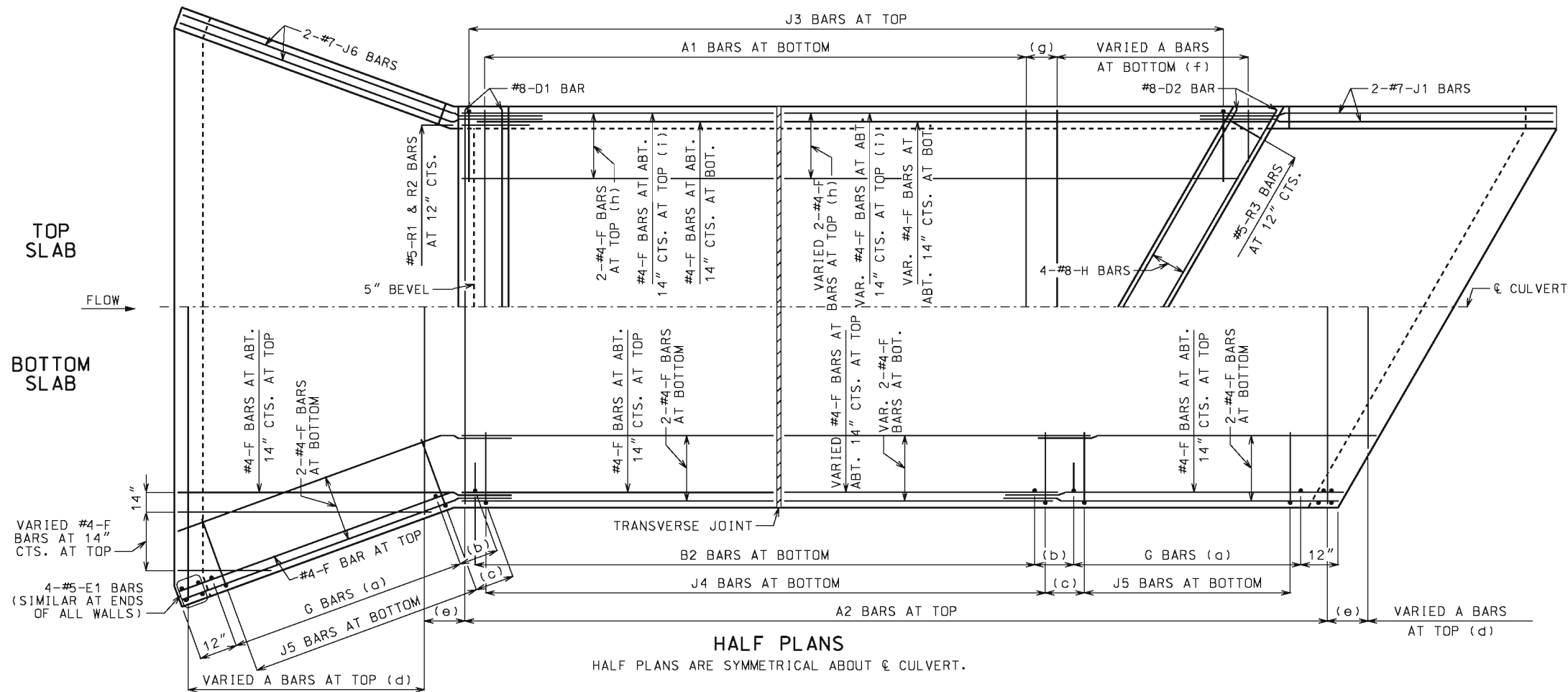
SKEW: RIGHT ADVANCE
WINGS: FLARED

LAYOUT

DATE EFFECTIVE: 07/01/2015
DATE PREPARED: 6/4/2015

703.15E

SHEET NO.
1 OF 3



LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON ROADWAY OR BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.16.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN HALF PLANS AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1½".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS B2 BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

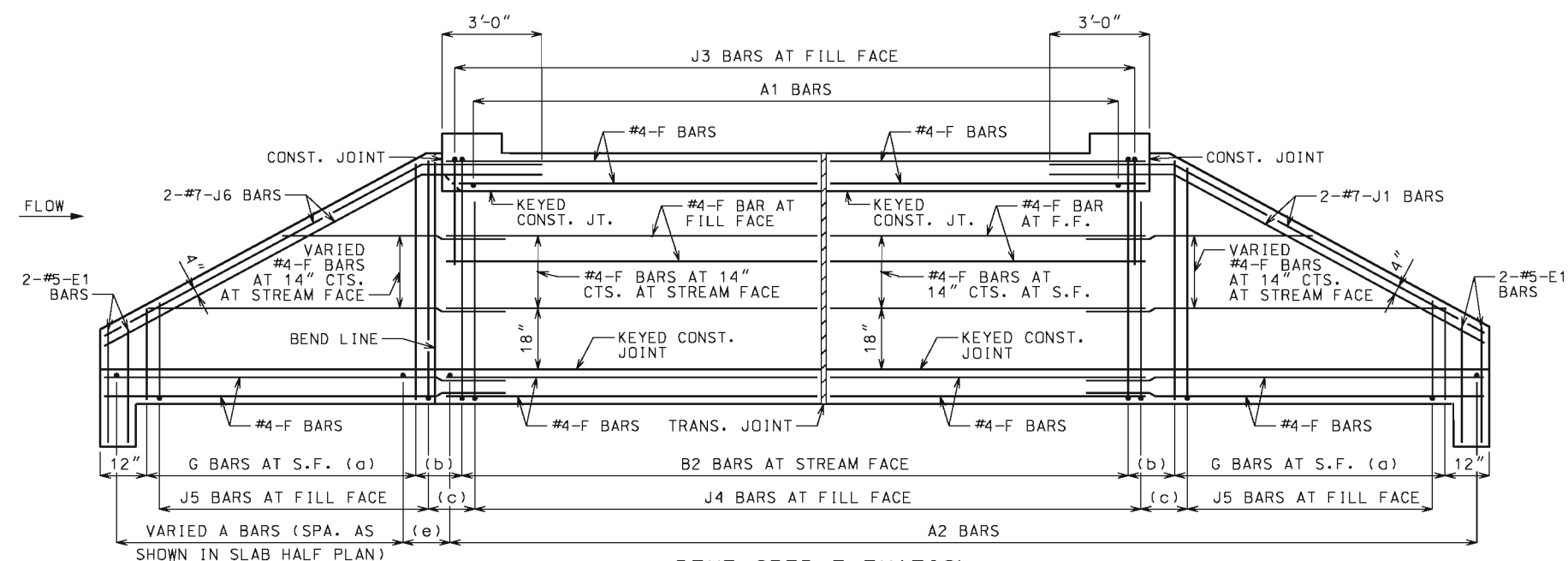
(e) A2 BAR SPACING


(f) SAME SIZE AND SPACING AS A1 BARS

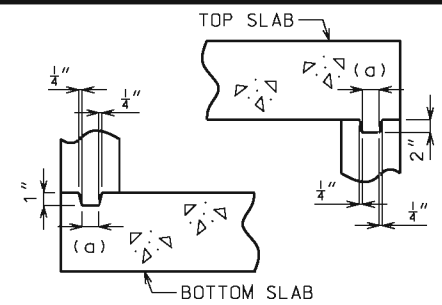
(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

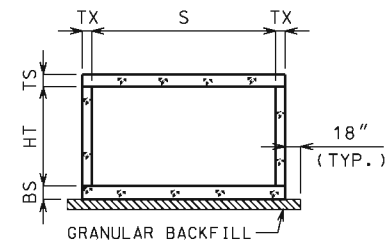
(i) FOR DESIGN FILLS 2'-0" OR LESS



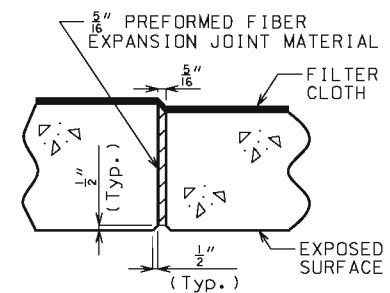
| | | |
|--|----------------|----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| CONCRETE SINGLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: FLARED | | |
| REINFORCEMENT | | |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.15E | SHEET NO. 2 OF 3 |



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



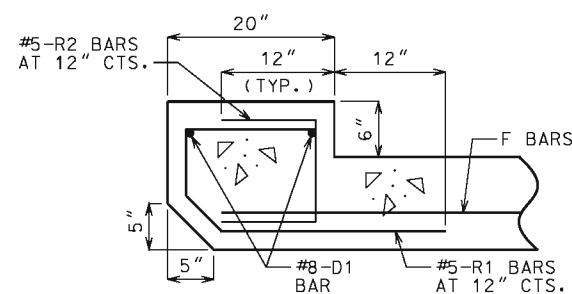
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



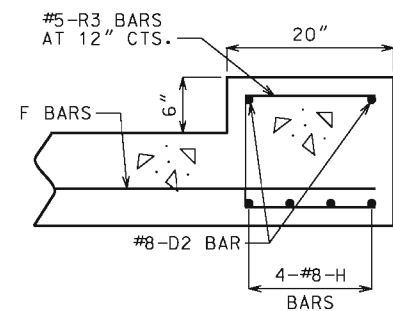
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

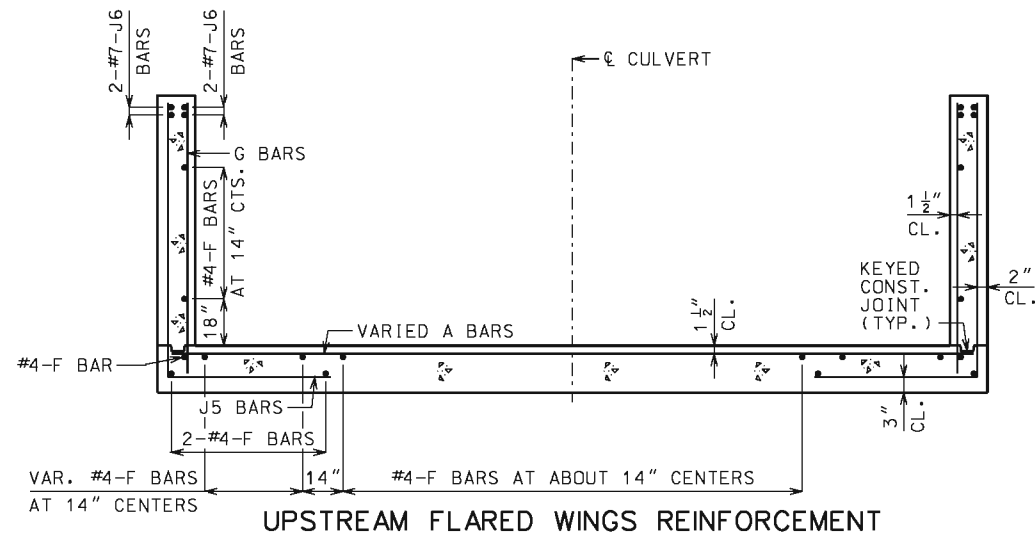
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



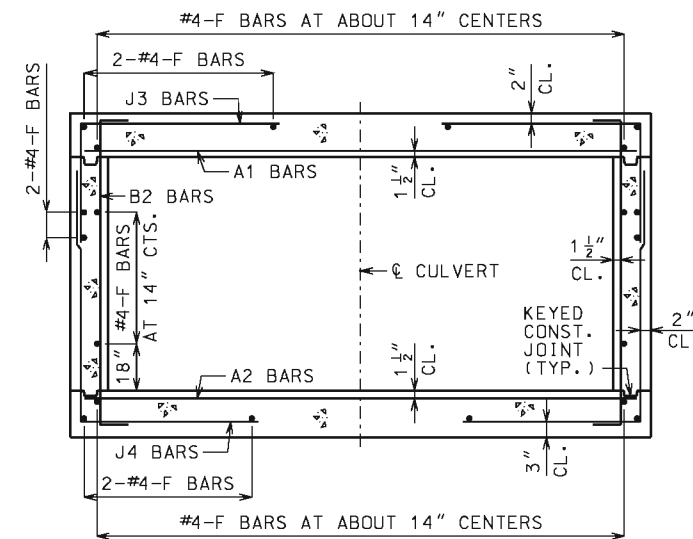
UPSTREAM HEADWALL REINFORCEMENT



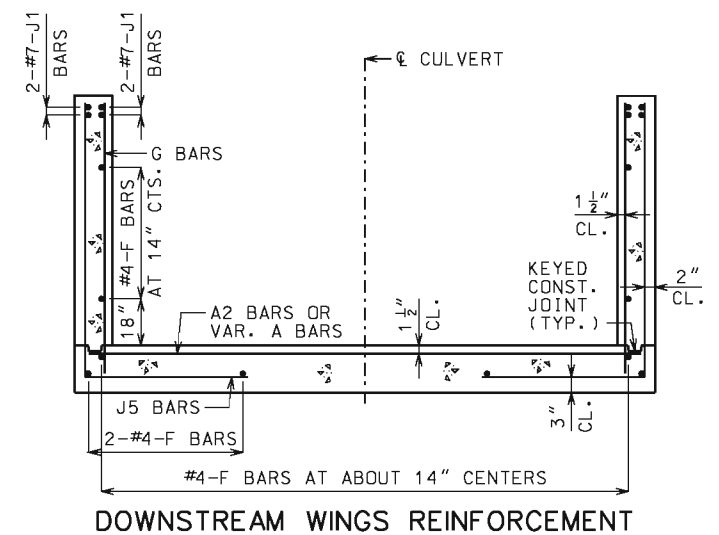
DOWNSTREAM HEADWALL REINFORCEMENT



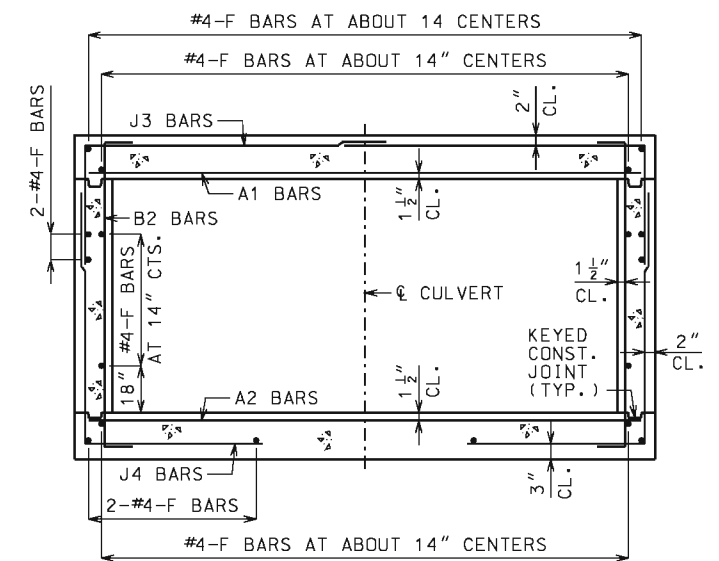
UPSTREAM FLARED WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS



GENERAL NOTES:

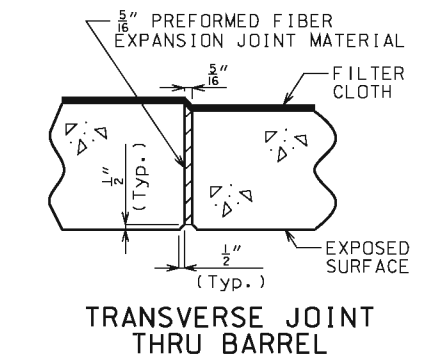
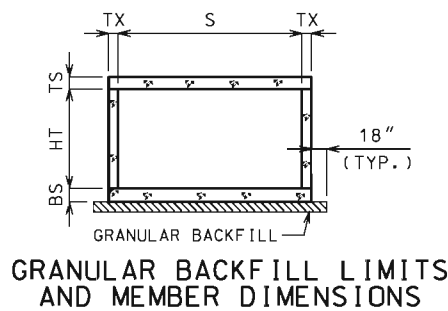
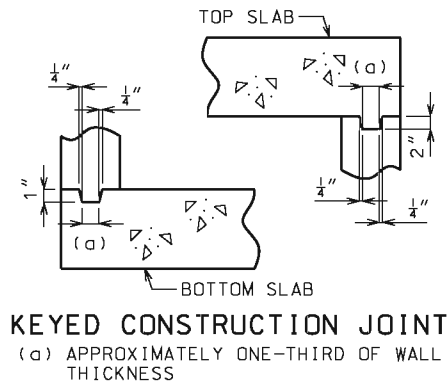
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.17. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

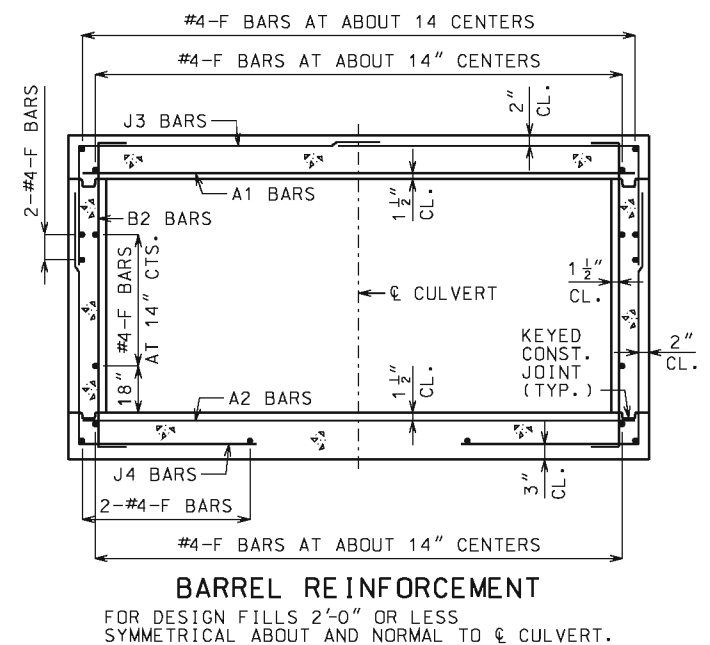
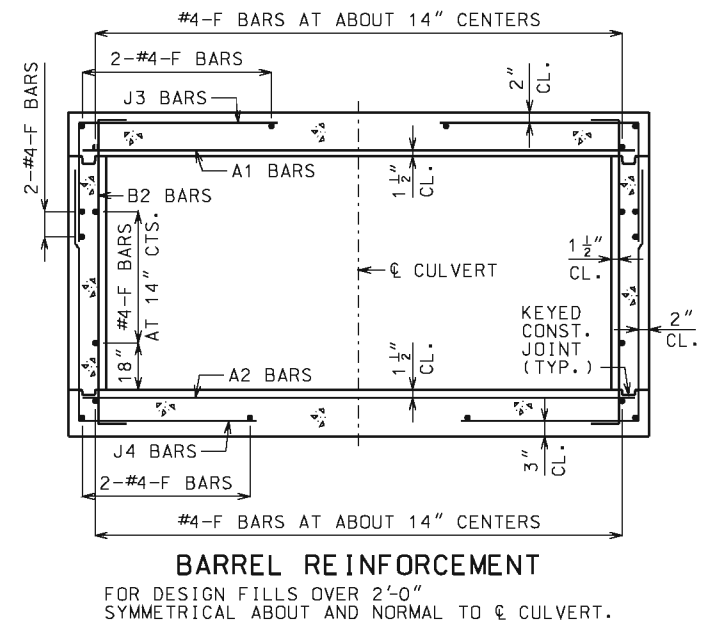
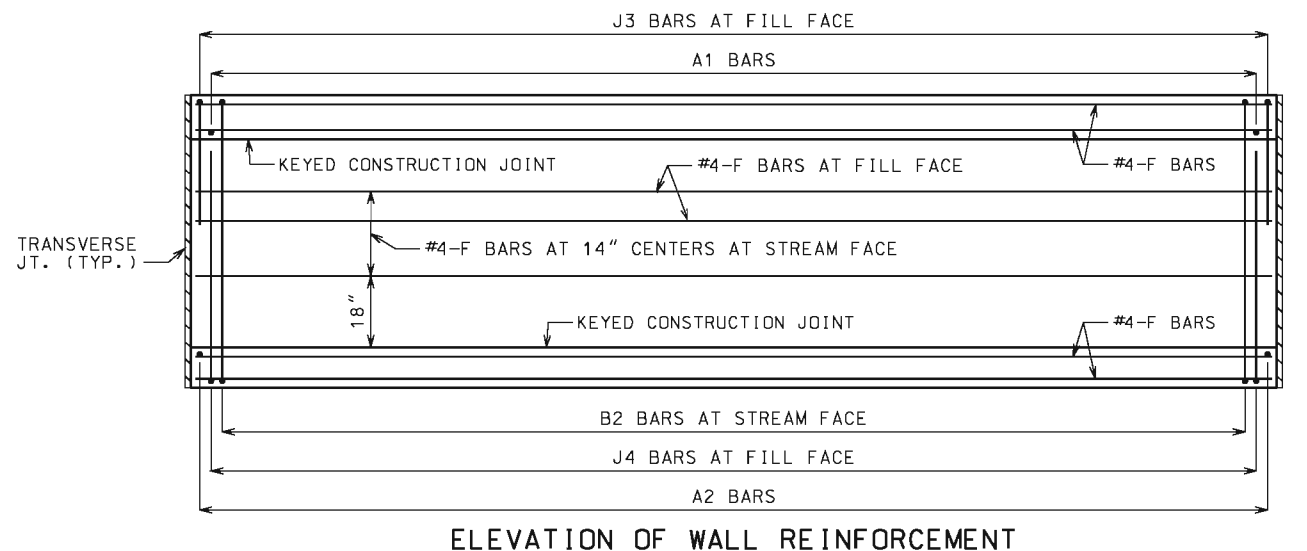
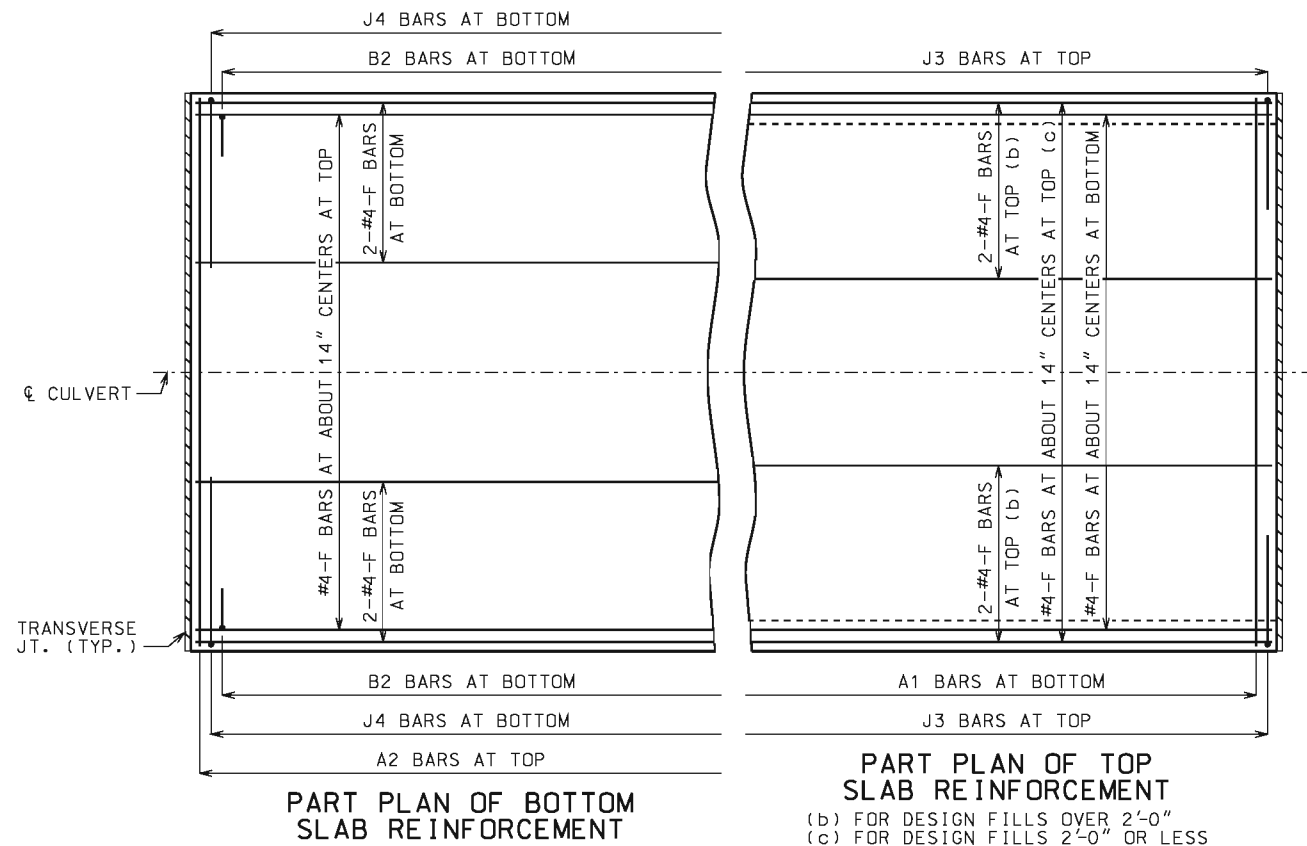
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 inch.

| | | |
|--|--|----------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | CONCRETE SINGLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: FLARED | |
| | SECTIONS | |
| DATE EFFECTIVE: <u>07/01/2015</u> DATE PREPARED: <u>5/13/2015</u> | 703.15E | SHEET NO. 3 OF 3 |



PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.17.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS AND ELEVATION.

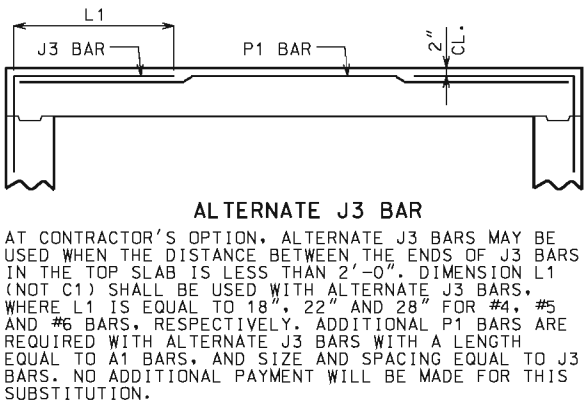
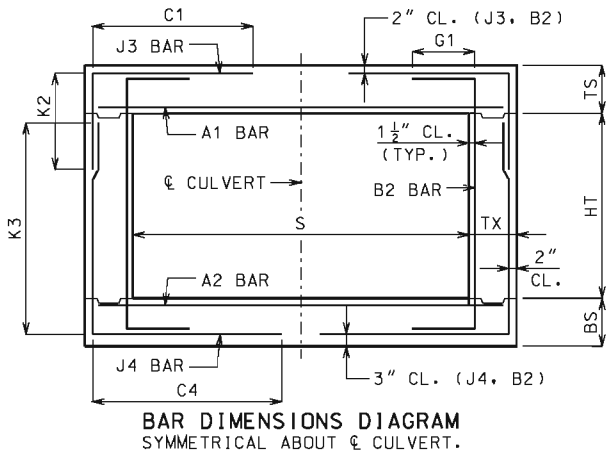
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

| | | |
|--|--|-----------------------------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| CONCRETE SINGLE BOX CULVERT CUT SECTION | | |
| | DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 5/13/2015 | 703.16 SHEET NO. 1 OF 1 |

| SPAN (S) = 3 FT | | | | | | | | | | | HEIGHT (HT) = 2 FT OR 3 FT | | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|---------|-------|----------------------------|------|------|------|------|---------|-------|-----------|------|----|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | BOTTOM SLAB BARS | | | | | | | WALL BARS | | | |
| | | | | A1 BARS | | J3 BARS | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | |
| | | | | | | | | | HT=2' | HT=3' | | | | | | HT=2' | HT=3' | | | | |
| 1 FT | 9 | 8 | 8 | 4 | 7 | 4 | 12 | 32.5 | 25.3 | 33.6 | 4 | 11.5 | 4 | 12 | 32.5 | 28 | 40 | 5 | 12 | 12 | |
| 2 FT | 9 | 8 | 8 | 4 | 7 | 4 | 12 | 32.5 | 25.3 | 33.6 | 4 | 11.5 | 4 | 12 | 30.8 | 28 | 40 | 5 | 12 | 12 | |
| 4 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.4 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 26.0 | 28 | 40 | 5 | 12 | 0 | |
| 6 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.6 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 24.6 | 28 | 40 | 5 | 12 | 0 | |
| 8 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 23.8 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 23.8 | 28 | 40 | 5 | 12 | 0 | |
| 10 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 12 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 14 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 16 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 18 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 12 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 20 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 11 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 22 FT | 8 | 8 | 8 | 4 | 11.5 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 10 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 24 FT | 8 | 8 | 8 | 4 | 10.5 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 9 | 4 | 12 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 26 FT | 8 | 8 | 8 | 4 | 9.5 | 4 | 12 | 22.0 | 24.1 | 32.4 | 4 | 8.5 | 4 | 11.5 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 28 FT | 8 | 8 | 8 | 4 | 9 | 4 | 11.5 | 22.0 | 24.1 | 32.4 | 4 | 8 | 4 | 10.5 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 30 FT | 8 | 8 | 8 | 4 | 8.5 | 4 | 11 | 22.0 | 24.1 | 32.4 | 4 | 7.5 | 4 | 10 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 32 FT | 8 | 8 | 8 | 4 | 8 | 4 | 10 | 22.0 | 24.1 | 32.4 | 4 | 7 | 4 | 9.5 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 34 FT | 8 | 8 | 8 | 4 | 7.5 | 4 | 9.5 | 22.0 | 24.1 | 32.4 | 4 | 6.5 | 4 | 8.5 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 36 FT | 8 | 8 | 8 | 4 | 7 | 4 | 9 | 22.0 | 24.1 | 32.4 | 4 | 6 | 4 | 8 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 38 FT | 8 | 8 | 8 | 4 | 6.5 | 4 | 8.5 | 22.0 | 24.1 | 32.4 | 5 | 9 | 4 | 8 | 22.0 | 28 | 40 | 5 | 12 | 0 | |
| 40 FT | 8 | 9 | 8 | 4 | 6.5 | 4 | 8 | 22.0 | 24.1 | 32.1 | 4 | 6 | 4 | 11 | 21.5 | 29 | 41 | 5 | 12 | 0 | |
| 42 FT | 8 | 9 | 8 | 4 | 6 | 4 | 8 | 22.0 | 24.1 | 32.1 | 5 | 9 | 4 | 10 | 21.5 | 29 | 41 | 5 | 12 | 0 | |
| 44 FT | 8 | 9 | 8 | 4 | 6 | 4 | 7.5 | 22.0 | 24.1 | 32.1 | 5 | 8.5 | 4 | 10 | 21.5 | 29 | 41 | 5 | 12 | 0 | |
| 46 FT | 8 | 9 | 8 | 4 | 6 | 4 | 7 | 22.0 | 24.1 | 32.1 | 5 | 8 | 4 | 9.5 | 21.5 | 29 | 41 | 5 | 12 | 0 | |
| 48 FT | 8 | 10 | 8 | 4 | 6 | 4 | 7 | 22.0 | 24.0 | 31.9 | 5 | 8.5 | 4 | 12 | 21.5 | 30 | 42 | 5 | 12 | 0 | |
| 50 FT | 8 | 10 | 8 | 4 | 6 | 4 | 6.5 | 22.0 | 24.0 | 31.9 | 5 | 8 | 4 | 12 | 21.5 | 30 | 42 | 5 | 12 | 0 | |

| SPAN (S) = 3 FT | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT | | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|---------|----------------------------|------------------|------|------|------|---------|-------|-------|-----------|------|----|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | BOTTOM SLAB BARS | | | | | | | WALL BARS | | |
| | | | | A1 BARS | | J3 BARS | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 |
| | | | | | | | | | HT=4' | HT=5' | | | | | | HT=4' | HT=5' | | | |
| 1 FT | 9 | 8 | 8 | 4 | 6.5 | 4 | 12 | 32.5 | 25.3 | 30.3 | 4 | 10.5 | 4 | 12 | 32.5 | 52 | 64 | 5 | 12 | 12 |
| 2 FT | 9 | 8 | 8 | 4 | 6.5 | 4 | 12 | 32.5 | 25.3 | 30.3 | 4 | 10 | 4 | 12 | 32.5 | 52 | 64 | 5 | 12 | 12 |
| 4 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 32.5 | 24.3 | 29.1 | 4 | 12 | 4 | 12 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 6 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 36.1 | 24.3 | 29.1 | 4 | 12 | 4 | 12 | 33.5 | 52 | 64 | 5 | 12 | 0 |
| 8 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 32.5 | 24.3 | 29.1 | 4 | 12 | 4 | 12 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 10 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 32.5 | 24.3 | 29.1 | 4 | 12 | 4 | 12 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 12 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 35.6 | 24.3 | 29.1 | 4 | 12 | 4 | 12 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 14 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 34.4 | 24.3 | 29.1 | 4 | 12 | 4 | 11.5 | 36.1 | 52 | 64 | 5 | 12 | 0 |
| 16 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 33.5 | 24.3 | 29.1 | 4 | 12 | 4 | 11 | 35.3 | 52 | 64 | 5 | 12 | 0 |
| 18 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 32.5 | 24.3 | 29.1 | 4 | 12 | 4 | 10.5 | 34.8 | 52 | 64 | 5 | 12 | 0 |
| 20 FT | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 31.6 | 24.3 | 29.1 | 4 | 10.5 | 4 | 10 | 34.4 | 52 | 64 | 5 | 12 | 0 |
| 22 FT | 8 | 8 | 8 | 4 | 11.5 | 4 | 11 | 31.6 | 24.3 | 29.1 | 4 | 9.5 | 4 | 9.5 | 33.9 | 52 | 64 | 5 | 12 | 0 |
| 24 FT | 8 | 8 | 8 | 4 | 10.5 | 4 | 10 | 31.6 | 24.3 | 29.1 | 4 | 9 | 4 | 9 | 33.9 | 52 | 64 | 5 | 12 | 0 |
| 26 FT | 8 | 8 | 8 | 4 | 9.5 | 4 | 9.5 | 31.3 | 24.3 | 29.1 | 4 | 8.5 | 4 | 8 | 33.5 | 52 | 64 | 5 | 12 | 0 |
| 28 FT | 8 | 8 | 8 | 4 | 9 | 4 | 8.5 | 31.3 | 24.3 | 29.1 | 4 | 7.5 | 4 | 7.5 | 33.0 | 52 | 64 | 5 | 12 | 0 |
| 30 FT | 8 | 8 | 8 | 4 | 8.5 | 4 | 8 | 31.3 | 24.3 | 29.1 | 4 | 7 | 4 | 7 | 33.0 | 52 | 64 | 5 | 12 | 0 |
| 32 FT | 8 | 8 | 8 | 4 | 8 | 4 | 7.5 | 30.8 | 24.3 | 29.1 | 4 | 7 | 4 | 6.5 | 33.0 | 52 | 64 | 5 | 12 | 0 |
| 34 FT | 8 | 8 | 8 | 4 | 7.5 | 4 | 7 | 30.8 | 24.3 | 29.1 | 4 | 6.5 | 4 | 6.5 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 36 FT | 8 | 8 | 8 | 4 | 7 | 4 | 7 | 30.8 | 24.3 | 29.1 | 4 | 6 | 4 | 6 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 38 FT | 8 | 8 | 8 | 4 | 6.5 | 4 | 6.5 | 30.8 | 24.3 | 29.1 | 5 | 9 | 5 | 7 | 32.5 | 52 | 64 | 5 | 12 | 0 |
| 40 FT | 8 | 9 | 8 | 4 | 6.5 | 4 | 6 | 30.8 | 24.0 | 28.8 | 4 | 6 | 4 | 6.5 | 32.5 | 53 | 65 | 5 | 12 | 0 |
| 42 FT | 8 | 9 | 8 | 4 | 6 | 4 | 6 | 30.8 | 24.0 | 28.8 | 5 | 9 | 4 | 6 | 32.5 | 53 | 65 | 5 | 11.5 | 0 |
| 44 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6.5 | 30.8 | 24.0 | 28.8 | 5 | 8.5 | 4 | 6 | 32.5 | 53 | 65 | 5 | 11 | 0 |
| 46 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6.5 | 30.4 | 24.0 | 28.8 | 5 | 8 | 5 | 6.5 | 34.8 | 53 | 65 | 5 | 10.5 | 0 |
| 48 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6 | 30.4 | 24.0 | 28.8 | 5 | 8 | 5 | 6.5 | 34.8 | 53 | 65 | 5 | 10 | 0 |
| 50 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6 | 30.4 | 24.0 | 28.8 | 5 | 7.5 | 5 | 6 | 34.8 | 53 | 65 | 5 | 9.5 | 0 |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

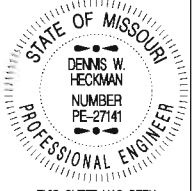
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE SINGLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 3 FEET
HEIGHT (HT): 2 THRU 5 FEET

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

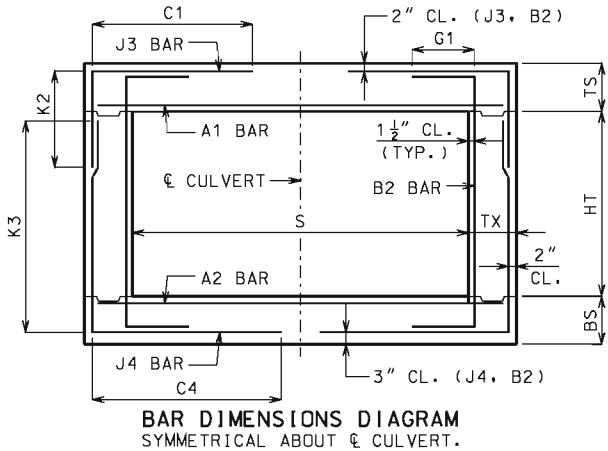
703.17

SHEET NO.
1 OF 14

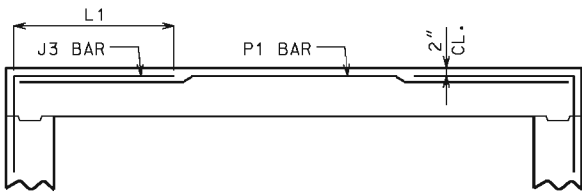
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 5 FT | | | | | | | | | | HEIGHT (HT) = 3 FT OR 4 FT | | | | | | | | | | |
|-----------------|------------------|----|----|---------------|------|---------|------|------|-------|----------------------------|------|---------|------|------|------|-----------|-------|------|------|----|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | BOTTOM SLAB BARS | | | | | | WALL BARS | | | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 |
| | | | | | | | | | HT=3' | HT=4' | | | | | | HT=3' | HT=4' | | | |
| 1 FT | 10 | 8 | 8 | 5 | 8 | 4 | 10.5 | 44.9 | 26.5 | 33.0 | 5 | 8.5 | 4 | 6 | 35.4 | 40 | 52 | 5 | 12 | 12 |
| 2 FT | 10 | 8 | 8 | 5 | 8 | 4 | 10.5 | 44.9 | 26.5 | 33.0 | 5 | 8 | 4 | 6 | 32.0 | 40 | 52 | 5 | 12 | 12 |
| 4 FT | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 28.5 | 24.5 | 30.6 | 4 | 7.5 | 4 | 10 | 28.5 | 40 | 52 | 5 | 12 | 0 |
| 6 FT | 8 | 8 | 8 | 4 | 10 | 4 | 12 | 27.3 | 24.5 | 30.6 | 4 | 8 | 4 | 10 | 27.3 | 40 | 52 | 5 | 12 | 0 |
| 8 FT | 8 | 8 | 8 | 4 | 9.5 | 4 | 11 | 26.5 | 24.5 | 30.6 | 4 | 8 | 4 | 9.5 | 26.5 | 40 | 52 | 5 | 12 | 0 |
| 10 FT | 8 | 8 | 8 | 4 | 10 | 4 | 12 | 25.1 | 24.5 | 30.6 | 4 | 8.5 | 4 | 10.5 | 25.1 | 40 | 52 | 5 | 12 | 0 |
| 12 FT | 8 | 8 | 8 | 4 | 8.5 | 4 | 10 | 25.1 | 24.5 | 30.6 | 4 | 7 | 4 | 9 | 25.1 | 40 | 52 | 5 | 12 | 0 |
| 14 FT | 8 | 8 | 8 | 4 | 7.5 | 4 | 8.5 | 25.1 | 24.5 | 30.6 | 4 | 6 | 4 | 7.5 | 25.1 | 40 | 52 | 5 | 12 | 0 |
| 16 FT | 8 | 8 | 8 | 4 | 6.5 | 4 | 7.5 | 25.1 | 24.5 | 30.6 | 5 | 8.5 | 4 | 7 | 25.1 | 40 | 52 | 5 | 12 | 0 |
| 18 FT | 8 | 8 | 8 | 4 | 6 | 4 | 6.5 | 25.1 | 24.5 | 30.6 | 5 | 8 | 4 | 6 | 25.1 | 40 | 52 | 5 | 12 | 0 |
| 20 FT | 8 | 8 | 8 | 4 | 6 | 4 | 6 | 25.1 | 24.5 | 30.6 | 5 | 8 | 5 | 6.5 | 25.1 | 40 | 52 | 5 | 12 | 0 |
| 22 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6.5 | 25.1 | 24.0 | 30.0 | 5 | 7.5 | 4 | 7 | 23.8 | 41 | 53 | 5 | 12 | 0 |
| 24 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6 | 25.1 | 24.0 | 30.0 | 5 | 7.5 | 4 | 6.5 | 23.8 | 41 | 53 | 5 | 12 | 0 |
| 26 FT | 9 | 10 | 8 | 5 | 8.5 | 4 | 6.5 | 24.5 | 25.0 | 31.0 | 5 | 7 | 4 | 8.5 | 23.8 | 42 | 54 | 5 | 12 | 0 |
| 28 FT | 9 | 10 | 8 | 5 | 8.5 | 4 | 6 | 24.5 | 25.0 | 31.0 | 5 | 7 | 4 | 8 | 23.8 | 42 | 54 | 5 | 12 | 0 |
| 30 FT | 9 | 11 | 8 | 5 | 8 | 5 | 6.5 | 24.5 | 25.5 | 31.5 | 5 | 6.5 | 4 | 9 | 23.1 | 43 | 55 | 5 | 12 | 0 |
| 32 FT | 10 | 11 | 8 | 5 | 8 | 4 | 6 | 23.8 | 26.0 | 32.0 | 5 | 6.5 | 4 | 8 | 23.1 | 43 | 55 | 5 | 12 | 0 |
| 34 FT | 10 | 12 | 8 | 5 | 7.5 | 5 | 7.5 | 23.8 | 26.5 | 32.5 | 5 | 6 | 4 | 9 | 22.5 | 44 | 56 | 5 | 12 | 0 |
| 36 FT | 10 | 12 | 8 | 5 | 7 | 5 | 7.5 | 23.8 | 26.5 | 32.5 | 5 | 6 | 4 | 8.5 | 22.5 | 44 | 56 | 5 | 12 | 0 |
| 38 FT | 11 | 12 | 8 | 5 | 7 | 4 | 6 | 23.8 | 27.0 | 33.0 | 5 | 6 | 4 | 8 | 23.1 | 44 | 56 | 5 | 12 | 0 |
| 40 FT | 11 | 13 | 8 | 5 | 6.5 | 5 | 8.5 | 23.8 | 27.5 | 33.5 | 5 | 6 | 4 | 8.5 | 22.5 | 45 | 57 | 5 | 12 | 0 |
| 42 FT | 12 | 13 | 8 | 5 | 6.5 | 4 | 6 | 23.1 | 28.0 | 34.0 | 5 | 6 | 4 | 8 | 23.1 | 45 | 57 | 5 | 12 | 0 |
| 44 FT | 12 | 13 | 8 | 5 | 6.5 | 5 | 9 | 23.1 | 28.0 | 34.0 | 5 | 6 | 4 | 7.5 | 23.1 | 45 | 57 | 5 | 12 | 0 |
| 46 FT | 12 | 14 | 8 | 5 | 6 | 5 | 8.5 | 23.8 | 28.5 | 34.5 | 6 | 8 | 4 | 7.5 | 22.5 | 46 | 58 | 5 | 12 | 0 |
| 48 FT | 13 | 14 | 8 | 5 | 6 | 4 | 6 | 23.1 | 29.0 | 35.0 | 6 | 8 | 4 | 7.5 | 23.1 | 46 | 58 | 5 | 12 | 0 |
| 50 FT | 13 | 14 | 8 | 5 | 6 | 5 | 8.5 | 23.1 | 29.0 | 35.0 | 6 | 8 | 4 | 7.5 | 23.1 | 46 | 58 | 5 | 12 | 0 |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT | | | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|-------|---------|------|------------------|------|------|------|---------|-------|----------------------------|------|-----------|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | | | | | | | |
| | | | | | | | | | HT=7' | HT=8' | | | | | | HT=7' | HT=8' | | | | | | | | | | | | |
| 1 FT | 10 | 9 | 8 | 5 | 8 | 4 | 9.5 | 44.9 | 26.5 | 29.8 | 5 | 7.5 | 4 | 7 | 44.9 | 89 | 101 | 5 | 12 | 12 | | | | | | | | | |
| 2 FT | 10 | 9 | 8 | 5 | 8 | 4 | 8.5 | 44.9 | 26.5 | 29.8 | 5 | 7.5 | 4 | 6.5 | 44.9 | 89 | 101 | 5 | 12 | 12 | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 4 | 7.5 | 4 | 7.5 | 44.9 | 24.8 | 27.9 | 4 | 6.5 | 4 | 6 | 44.9 | 88 | 100 | 5 | 12 | 0 | | | | | | | | | |
| 6 FT | 8 | 9 | 8 | 4 | 9 | 4 | 7.5 | 44.9 | 24.0 | 27.0 | 4 | 7.5 | 4 | 6.5 | 44.9 | 89 | 101 | 5 | 12 | 0 | | | | | | | | | |
| 8 FT | 8 | 9 | 8 | 4 | 9 | 4 | 7 | 44.9 | 24.0 | 27.0 | 4 | 7.5 | 4 | 6 | 44.9 | 89 | 101 | 5 | 12 | 0 | | | | | | | | | |
| 10 FT | 8 | 9 | 8 | 4 | 10 | 4 | 7.5 | 44.9 | 24.0 | 27.0 | 4 | 8 | 4 | 6.5 | 44.9 | 89 | 101 | 5 | 12 | 0 | | | | | | | | | |
| 12 FT | 8 | 10 | 8 | 4 | 8.5 | 4 | 6.5 | 44.9 | 24.3 | 27.3 | 4 | 8 | 4 | 6.5 | 44.9 | 90 | 102 | 5 | 12 | 0 | | | | | | | | | |
| 14 FT | 8 | 10 | 9 | 4 | 7.5 | 4 | 6.5 | 41.4 | 24.3 | 27.3 | 4 | 7 | 4 | 7 | 45.5 | 90 | 102 | 5 | 12 | 0 | | | | | | | | | |
| 16 FT | 8 | 10 | 9 | 4 | 6.5 | 4 | 6 | 40.8 | 24.3 | 27.3 | 4 | 6 | 4 | 6.5 | 45.5 | 90 | 102 | 5 | 11.5 | 0 | | | | | | | | | |
| 18 FT | 8 | 10 | 9 | 4 | 6 | 5 | 6.5 | 40.0 | 24.3 | 27.3 | 5 | 9 | 4 | 6 | 45.5 | 90 | 102 | 5 | 10.5 | 0 | | | | | | | | | |
| 20 FT | 8 | 10 | 9 | 4 | 6 | 5 | 6 | 39.4 | 25.3 | 28.4 | 5 | 8 | 5 | 6.5 | 47.6 | 90 | 102 | 5 | 10 | 0 | | | | | | | | | |
| 22 FT | 8 | 10 | 9 | 4 | 6 | 6 | 7 | 42.1 | 25.3 | 28.4 | 5 | 7.5 | 5 | 6 | 47.6 | 90 | 102 | 5 | 9 | 0 | | | | | | | | | |
| 24 FT | 9 | 11 | 9 | 5 | 8.5 | 5 | 6 | 41.4 | 26.8 | 30.0 | 5 | 7.5 | 5 | 6 | 47.6 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | |
| 26 FT | 9 | 11 | 9 | 5 | 8.5 | 5 | 6 | 41.4 | 26.8 | 30.0 | 5 | 7 | 6 | 7.5 | 49.6 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | |
| 28 FT | 9 | 11 | 9 | 5 | 8.5 | 5 | 6 | 41.4 | 29.8 | 33.3 | 5 | 6.5 | 6 | 7 | 49.6 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | |
| 30 FT | 9 | 11 | 9 | 5 | 8 | 5 | 6 | 40.8 | 29.8 | 33.3 | 5 | 6.5 | 6 | 6.5 | 49.6 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | |
| 32 FT | 10 | 11 | 9 | 5 | 8 | 5 | 6 | 46.3 | 30.0 | 33.6 | 5 | 6.5 | 6 | 6 | 49.6 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | |
| 34 FT | 10 | 11 | 9 | 5 | 7.5 | 5 | 6 | 45.5 | 30.0 | 33.6 | 5 | 6 | 6 | 6 | 49.6 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | |
| 36 FT | 10 | 12 | 10 | 5 | 7 | 5 | 6.5 | 40.6 | 30.3 | 33.9 | 5 | 6 | 5 | 6 | 49.0 | 92 | 104 | 5 | 8 | 0 | | | | | | | | | |
| 38 FT | 11 | 12 | 10 | 5 | 7.5 | 5 | 6 | 43.4 | 31.6 | 35.4 | 5 | 6 | 6 | 7 | 51.1 | 92 | 104 | 5 | 8 | 0 | | | | | | | | | |
| 40 FT | 11 | 12 | 11 | 5 | 7.5 | 5 | 7 | 41.1 | 31.6 | 35.4 | 5 | 6 | 5 | 6.5 | 49.8 | 92 | 104 | 5 | 7.5 | 0 | | | | | | | | | |
| 42 FT | 11 | 13 | 11 | 5 | 7 | 5 | 7 | 41.1 | 31.9 | 35.6 | 5 | 6 | 5 | 6.5 | 49.8 | 93 | 105 | 5 | 7.5 | 0 | | | | | | | | | |
| 44 FT | 12 | 13 | 11 | 5 | 7 | 5 | 6.5 | 43.3 | 32.3 | 36.0 | 5 | 6 | 5 | 6 | 49.8 | 93 | 105 | 5 | 7.5 | 0 | | | | | | | | | |
| 46 FT | 12 | 13 | 11 | 5 | 7 | 5 | 6 | 43.3 | 32.3 | 36.0 | 5 | 6 | 5 | 6 | 49.8 | 93 | 105 | 5 | 7.5 | 0 | | | | | | | | | |
| 48 FT | 12 | 14 | 12 | 5 | 6.5 | 5 | 6.5 | 41.0 | 32.5 | 36.3 | 6 | 8 | 5 | 6.5 | 51.1 | 94 | 106 | 5 | 7 | 0 | | | | | | | | | |
| 50 FT | 13 | 14 | 12 | 5 | 6.5 | 5 | 6.5 | 43.3 | 33.9 | 37.8 | 6 | 8 | 5 | 6.5 | 51.1 | 94 | 106 | 5 | 7 | 0 | | | | | | | | | |



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ϵ CULVERT.



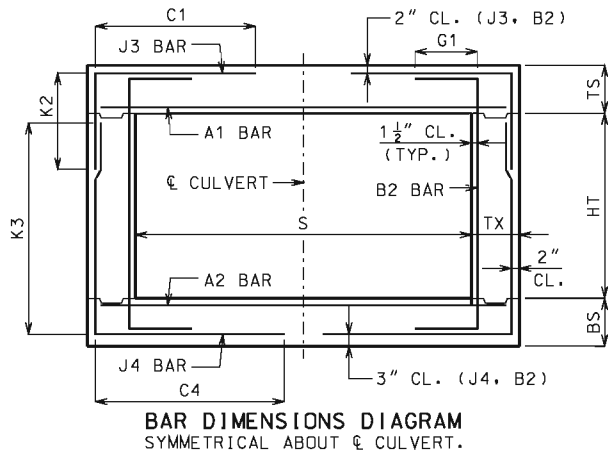
ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

| SPAN (S) = 5 FT | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT | | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|-------|----------------------------|------------------|------|---------|------|------|-------|-------|-----------|------|----|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | BOTTOM SLAB BARS | | | | | | | WALL BARS | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 |
| | | | | | | | | | HT=5' | HT=6' | | | | | | HT=5' | HT=6' | | | |
| 1 FT | 10 | 8 | 8 | 5 | 8 | 4 | 10.5 | 44.9 | 26.3 | 30.6 | 5 | 8 | 4 | 6 | 44.9 | 64 | 76 | 5 | 12 | 12 |
| 2 FT | 10 | 8 | 8 | 5 | 8 | 4 | 10.5 | 44.9 | 26.3 | 30.6 | 5 | 8 | 4 | 6 | 44.9 | 64 | 76 | 5 | 12 | 12 |
| 4 FT | 8 | 8 | 8 | 4 | 8 | 4 | 11 | 44.9 | 24.1 | 28.3 | 4 | 7 | 4 | 8.5 | 44.9 | 64 | 76 | 5 | 12 | 0 |
| 6 FT | 8 | 8 | 8 | 4 | 9 | 4 | 10.5 | 39.5 | 24.1 | 28.3 | 4 | 7.5 | 4 | 8 | 38.1 | 64 | 76 | 5 | 12 | 0 |
| 8 FT | 8 | 8 | 8 | 4 | 9 | 4 | 10 | 34.6 | 24.1 | 28.3 | 4 | 7 | 4 | 7.5 | 34.6 | 64 | 76 | 5 | 12 | 0 |
| 10 FT | 8 | 8 | 8 | 4 | 9.5 | 4 | 11 | 30.6 | 24.1 | 28.3 | 4 | 8 | 4 | 8 | 30.6 | 64 | 76 | 5 | 12 | 0 |
| 12 FT | 8 | 8 | 8 | 4 | 8 | 4 | 9 | 29.9 | 24.1 | 28.3 | 4 | 6.5 | 4 | 7.5 | 30.6 | 64 | 76 | 5 | 12 | 0 |
| 14 FT | 8 | 8 | 8 | 4 | 7 | 4 | 8 | 29.9 | 24.1 | 28.3 | 4 | 6 | 4 | 6.5 | 29.9 | 64 | 76 | 5 | 12 | 0 |
| 16 FT | 8 | 8 | 8 | 4 | 6 | 4 | 7 | 29.3 | 24.1 | 28.3 | 5 | 8 | 4 | 6 | 29.9 | 64 | 76 | 5 | 12 | 0 |
| 18 FT | 8 | 8 | 8 | 4 | 6 | 4 | 6 | 29.3 | 24.1 | 28.3 | 5 | 8 | 5 | 6.5 | 29.9 | 64 | 76 | 5 | 12 | 0 |
| 20 FT | 8 | 8 | 8 | 4 | 6 | 5 | 6.5 | 29.3 | 24.1 | 28.3 | 5 | 8 | 5 | 6 | 29.9 | 64 | 76 | 5 | 12 | 0 |
| 22 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6 | 29.3 | 24.5 | 28.5 | 5 | 7.5 | 4 | 6 | 29.9 | 65 | 77 | 5 | 12 | 0 |
| 24 FT | 8 | 9 | 8 | 5 | 9 | 6 | 7.5 | 32.0 | 28.1 | 32.8 | 5 | 7.5 | 5 | 6.5 | 29.9 | 65 | 77 | 5 | 12 | 0 |
| 26 FT | 9 | 10 | 8 | 5 | 8.5 | 5 | 6.5 | 29.3 | 25.1 | 29.3 | 5 | 7 | 4 | 6 | 30.6 | 66 | 78 | 5 | 12 | 0 |
| 28 FT | 9 | 10 | 8 | 5 | 8 | 5 | 6.5 | 29.3 | 25.1 | 29.3 | 5 | 7 | 5 | 7 | 29.9 | 66 | 78 | 5 | 12 | 0 |
| 30 FT | 9 | 10 | 8 | 5 | 7.5 | 5 | 6.5 | 29.3 | 29.6 | 34.4 | 5 | 6.5 | 5 | 6.5 | 29.9 | 66 | 78 | 5 | 12 | 0 |
| 32 FT | 10 | 11 | 8 | 5 | 7.5 | 5 | 7 | 29.3 | 26.6 | 30.8 | 5 | 6.5 | 5 | 7.5 | 30.6 | 67 | 79 | 5 | 12 | 0 |
| 34 FT | 10 | 11 | 8 | 5 | 7.5 | 5 | 6.5 | 29.3 | 26.6 | 30.8 | 5 | 6.5 | 5 | 7 | 30.6 | 67 | 79 | 5 | 11.5 | 0 |
| 36 FT | 10 | 11 | 8 | 5 | 7 | 5 | 6.5 | 29.3 | 30.4 | 35.3 | 5 | 6 | 5 | 6 | 30.6 | 67 | 79 | 5 | 11 | 0 |
| 38 FT | 11 | 12 | 8 | 5 | 7 | 5 | 7 | 29.9 | 27.3 | 31.5 | 5 | 6 | 5 | 7 | 31.3 | 68 | 80 | 5 | 10 | 0 |
| 40 FT | 11 | 12 | 8 | 5 | 6.5 | 5 | 6.5 | 29.9 | 31.3 | 36.0 | 5 | 6 | 5 | 6.5 | 31.3 | 68 | 80 | 5 | 10 | 0 |
| 42 FT | 11 | 13 | 8 | 5 | 6.5 | 5 | 6 | 29.9 | 27.6 | 31.9 | 5 | 6 | 5 | 7 | 31.3 | 69 | 81 | 5 | 9.5 | 0 |
| 44 FT | 12 | 13 | 8 | 5 | 6.5 | 5 | 6.5 | 29.9 | 28.0 | 32.3 | 5 | 6 | 5 | 6.5 | 32.0 | 69 | 81 | 5 | 9.5 | 0 |
| 46 FT | 12 | 13 | 8 | 5 | 6 | 5 | 6 | 29.9 | 32.0 | 36.8 | 5 | 6 | 5 | 6 | 31.3 | 69 | 81 | 5 | 9.5 | 0 |
| 48 FT | 12 | 14 | 9 | 5 | 6 | 5 | 7 | 30.4 | 28.4 | 32.5 | 6 | 8 | 5 | 8 | 31.8 | 70 | 82 | 5 | 9.5 | 0 |
| 50 FT | 13 | 14 | 9 | 5 | 6 | 5 | 7.5 | 30.4 | 29.5 | 33.9 | 6 | 8 | 5 | 7.5 | 32.4 | 70 | 82 | 5 | 9 | 0 |

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------------------|------|------|------|-------|------------------------------------|-------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | | | | | | | | |
| | | | | | | | | | HT=3' | HT=4' | HT=5' | | | | | | HT=3' | HT=4' | HT=5' | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 5 | 8 | 4 | 9 | 51.3 | 26.5 | 33.0 | 39.4 | 5 | 8 | 5 | 6 | 41.6 | 40 | 52 | 64 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 5 | 7.5 | 4 | 9.5 | 51.3 | 27.0 | 33.5 | 40.0 | 5 | 8 | 6 | 7.5 | 36.0 | 40 | 52 | 64 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 4 | 6.5 | 4 | 7.5 | 32.8 | 24.5 | 30.6 | 36.9 | 5 | 8.5 | 4 | 6.5 | 32.0 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 4 | 7 | 4 | 8 | 30.4 | 24.5 | 30.6 | 36.9 | 5 | 9 | 4 | 7 | 30.4 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 4 | 6.5 | 4 | 7.5 | 29.6 | 24.5 | 30.6 | 36.9 | 5 | 8.5 | 4 | 6.5 | 29.6 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 4 | 7 | 4 | 8 | 27.3 | 24.5 | 30.6 | 36.9 | 4 | 6 | 4 | 7 | 27.3 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 4 | 6 | 4 | 7 | 27.3 | 24.5 | 30.6 | 36.9 | 5 | 8 | 4 | 6 | 27.3 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 4 | 6 | 4 | 6 | 27.3 | 24.5 | 30.6 | 36.9 | 5 | 8 | 5 | 6 | 27.3 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 4 | 6 | 5 | 6 | 27.3 | 28.3 | 35.4 | 42.6 | 5 | 8 | 6 | 7 | 30.4 | 40 | 52 | 64 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 8 | 5 | 8.5 | 6 | 7.5 | 30.4 | 24.0 | 30.0 | 36.0 | 5 | 7.5 | 4 | 6 | 26.4 | 41 | 53 | 65 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 20 FT | 8 | 9 | 8 | 5 | 7.5 | 6 | 7.5 | 30.4 | 28.4 | 35.4 | 42.5 | 5 | 7 | 5 | 6.5 | 26.4 | 41 | 53 | 65 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 22 FT | 9 | 10 | 8 | 5 | 7.5 | 5 | 6.5 | 26.4 | 25.0 | 31.0 | 37.0 | 5 | 7 | 4 | 6.5 | 25.6 | 42 | 54 | 66 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 24 FT | 9 | 11 | 8 | 5 | 7 | 5 | 6.5 | 26.4 | 25.5 | 31.5 | 37.5 | 5 | 6.5 | 4 | 7 | 24.8 | 43 | 55 | 67 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 8 | 5 | 7 | 5 | 7.5 | 26.4 | 26.0 | 32.0 | 38.0 | 5 | 6.5 | 4 | 6.5 | 25.6 | 43 | 55 | 67 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 28 FT | 10 | 12 | 8 | 5 | 6.5 | 5 | 7.5 | 26.4 | 26.5 | 32.5 | 38.5 | 5 | 6 | 4 | 7 | 24.8 | 44 | 56 | 68 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 30 FT | 11 | 12 | 8 | 5 | 6.5 | 5 | 8.5 | 25.6 | 27.0 | 33.0 | 39.0 | 5 | 6 | 4 | 6 | 24.8 | 44 | 56 | 68 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 32 FT | 11 | 13 | 8 | 5 | 6 | 5 | 8 | 25.6 | 27.5 | 33.5 | 39.5 | 5 | 6 | 4 | 7 | 24.8 | 45 | 57 | 69 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 34 FT | 12 | 13 | 8 | 5 | 6 | 5 | 8.5 | 25.6 | 28.0 | 34.0 | 40.0 | 5 | 6 | 4 | 6 | 24.8 | 45 | 57 | 69 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 36 FT | 12 | 14 | 8 | 6 | 8 | 5 | 8.5 | 25.6 | 28.5 | 34.5 | 40.5 | 6 | 8 | 4 | 6.5 | 24.8 | 46 | 58 | 70 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 38 FT | 13 | 14 | 8 | 6 | 8 | 5 | 8.5 | 24.8 | 29.0 | 35.0 | 41.0 | 6 | 8 | 4 | 6 | 24.8 | 46 | 58 | 70 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 40 FT | 13 | 14 | 8 | 6 | 7.5 | 5 | 8.5 | 24.8 | 29.0 | 35.0 | 41.0 | 6 | 7.5 | 5 | 9 | 24.8 | 46 | 58 | 70 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 42 FT | 14 | 15 | 8 | 6 | 8 | 5 | 8.5 | 24.8 | 30.0 | 36.0 | 42.0 | 6 | 7.5 | 4 | 6 | 24.8 | 47 | 59 | 71 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 44 FT | 14 | 15 | 8 | 6 | 7.5 | 5 | 8.5 | 24.8 | 30.0 | 36.0 | 42.0 | 6 | 7.5 | 5 | 8.5 | 24.8 | 47 | 59 | 71 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 46 FT | 14 | 16 | 8 | 6 | 7 | 5 | 8.5 | 24.8 | 30.5 | 36.5 | 42.5 | 6 | 7 | 4 | 6 | 24.8 | 48 | 60 | 72 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 48 FT | 15 | 16 | 8 | 6 | 7 | 5 | 8 | 29.6 | 31.0 | 37.0 | 43.0 | 6 | 7 | 5 | 8 | 25.6 | 48 | 60 | 72 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 50 FT | 15 | 16 | 8 | 6 | 7 | 5 | 8 | 29.6 | 31.0 | 37.0 | 43.0 | 6 | 7 | 5 | 8 | 24.8 | 48 | 60 | 72 | 5 | 12 | 0 | | | | | | | | | | | | | |

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------------------|------|------|-------|-------|----------------------------|------|----|--|-----------|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | | | | | | | | | | | |
| | | | | | | | | | HT=8' | HT=9' | | | | | | HT=8' | HT=9' | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 10 | 8 | 5 | 8 | 4 | 7 | 51.3 | 26.6 | 29.5 | 5 | 7 | 4 | 6.5 | 51.3 | 102 | 114 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 2 FT | 11 | 10 | 8 | 5 | 7.5 | 4 | 7 | 51.3 | 28.0 | 31.0 | 5 | 7 | 4 | 6 | 51.3 | 102 | 114 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 4 FT | 8 | 9 | 9 | 4 | 6 | 4 | 6.5 | 51.9 | 24.9 | 27.6 | 5 | 8 | 4 | 6.5 | 51.9 | 101 | 113 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 9 | 4 | 6.5 | 4 | 6.5 | 51.9 | 24.9 | 27.6 | 5 | 8.5 | 4 | 6 | 51.9 | 101 | 113 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 8 FT | 8 | 10 | 9 | 4 | 6.5 | 4 | 6 | 51.9 | 25.1 | 27.9 | 4 | 6 | 4 | 6 | 51.9 | 102 | 114 | 5 | 11.5 | 0 | | | | | | | | | | | | | |
| 10 FT | 8 | 10 | 9 | 4 | 7.5 | 4 | 6.5 | 45.4 | 25.1 | 27.9 | 4 | 6.5 | 4 | 6.5 | 51.9 | 102 | 114 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 12 FT | 8 | 10 | 9 | 4 | 6 | 5 | 6.5 | 43.8 | 25.1 | 27.9 | 5 | 8.5 | 4 | 6 | 51.9 | 102 | 114 | 5 | 11.5 | 0 | | | | | | | | | | | | | |
| 14 FT | 8 | 10 | 9 | 4 | 6 | 5 | 6 | 42.1 | 26.1 | 29.0 | 5 | 7.5 | 5 | 6.5 | 54.3 | 102 | 114 | 5 | 10 | 0 | | | | | | | | | | | | | |
| 16 FT | 8 | 10 | 9 | 4 | 6 | 6 | 7 | 44.5 | 28.4 | 31.5 | 5 | 7 | 5 | 6 | 54.3 | 102 | 114 | 5 | 9.5 | 0 | | | | | | | | | | | | | |
| 18 FT | 8 | 10 | 9 | 5 | 9 | 6 | 7 | 43.8 | 29.4 | 32.6 | 5 | 7 | 6 | 7 | 55.9 | 102 | 114 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 20 FT | 9 | 10 | 9 | 5 | 8.5 | 5 | 6 | 43.8 | 29.8 | 33.0 | 5 | 7 | 6 | 6.5 | 56.8 | 102 | 114 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 22 FT | 9 | 11 | 9 | 5 | 8 | 5 | 6 | 42.9 | 30.0 | 33.3 | 5 | 6.5 | 6 | 6.5 | 55.9 | 103 | 115 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 24 FT | 10 | 11 | 9 | 5 | 7.5 | 5 | 6 | 45.4 | 30.3 | 33.5 | 5 | 6.5 | 6 | 6 | 55.9 | 103 | 115 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 9 | 5 | 7 | 5 | 6 | 44.5 | 30.3 | 33.5 | 5 | 6 | 6 | 6 | 55.9 | 103 | 115 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 28 FT | 10 | 12 | 9 | 5 | 6.5 | 6 | 7 | 47.0 | 31.6 | 35.0 | 5 | 6 | 6 | 6 | 55.9 | 104 | 116 | 5 | 8 | 0 | | | | | | | | | | | | | |
| 30 FT | 11 | 12 | 9 | 5 | 6.5 | 6 | 6.5 | 49.4 | 35.4 | 39.0 | 5 | 6 | 6 | 6 | 55.9 | 104 | 116 | 5 | 8 | 0 | | | | | | | | | | | | | |
| 32 FT | 11 | 13 | 10 | 5 | 6.5 | 6 | 8 | 46.8 | 32.3 | 35.5 | 5 | 6 | 6 | 6.5 | 56.6 | 105 | 117 | 5 | 8 | 0 | | | | | | | | | | | | | |
| 34 FT | 12 | 13 | 11 | 5 | 6.5 | 5 | 6.5 | 44.0 | 32.5 | 35.9 | 5 | 6 | 5 | 6 | 49.8 | 105 | 117 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 36 FT | 12 | 13 | 11 | 5 | 6 | 5 | 6.5 | 44.0 | 32.5 | 35.9 | 6 | 8 | 6 | 7.5 | 52.3 | 105 | 117 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 38 FT | 12 | 14 | 12 | 5 | 6 | 5 | 6 | 42.0 | 32.8 | 36.1 | 6 | 8 | 5 | 6 | 48.8 | 106 | 118 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 40 FT | 13 | 14 | 12 | 5 | 6 | 5 | 6 | 44.5 | 33.0 | 36.4 | 6 | 8 | 5 | 6 | 48.8 | 106 | 118 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 42 FT | 13 | 15 | 12 | 5 | 6 | 5 | 6 | 43.6 | 33.4 | 36.6 | 6 | 7.5 | 5 | 6 | 52.1 | 107 | 119 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 44 FT | 14 | 15 | 13 | 5 | 6 | 5 | 6 | 44.3 | 34.8 | 38.3 | 6 | 7.5 | 5 | 6 | 48.5 | 107 | 119 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 46 FT | 14 | 15 | 13 | 6 | 8 | 5 | 6 | 44.3 | 34.8 | 38.3 | 6 | 7.5 | 6 | 8 | 51.0 | 107 | 119 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 48 FT | 14 | 16 | 13 | 6 | 8 | 5 | 6 | 44.3 | 35.1 | 38.6 | 6 | 7 | 5 | 6 | 50.1 | 108 | 120 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 50 FT | 15 | 16 | 13 | 6 | 8 | 5 | 6 | 51.0 | 35.4 | 38.9 | 6 | 7 | 6 | 8 | 53.5 | 108 | 120 | 5 | 6.5 | 0 | | | | | | | | | | | | | |



BAR DIMENSIONS DIAGRAM
SYMMETRICAL

| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT | | | | | | | | | |
|-----------------|------------------|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------------------|------|------|------|-------|------------------------------------|-------|------|------|-----------|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | |
| | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | |
| 1 FT | 11 | 9 | 8 | 5 | 7.5 | 4 | 9 | 57.0 | 27.1 | 32.3 | 37.4 | 5 | 7.5 | 4 | 6 | 54.3 | 53 | 65 | 77 | 5 | 12 | 12 | | | | | |
| 2 FT | 11 | 9 | 8 | 5 | 7.5 | 4 | 9 | 57.0 | 27.1 | 32.3 | 37.4 | 5 | 7.5 | 5 | 7 | 43.3 | 53 | 65 | 77 | 5 | 12 | 12 | | | | | |
| 4 FT | 8 | 8 | 8 | 4 | 6 | 4 | 6 | 36.8 | 24.3 | 29.1 | 34.0 | 5 | 8 | 5 | 6 | 35.9 | 52 | 64 | 76 | 5 | 12 | 0 | | | | | |
| 6 FT | 8 | 8 | 8 | 4 | 6 | 4 | 6 | 33.1 | 24.3 | 29.1 | 34.0 | 5 | 8 | 5 | 6 | 33.1 | 52 | 64 | 76 | 5 | 12 | 0 | | | | | |
| 8 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6.5 | 32.3 | 24.0 | 28.8 | 33.6 | 5 | 7.5 | 4 | 6.5 | 32.3 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 10 FT | 8 | 9 | 8 | 4 | 6 | 4 | 6 | 30.4 | 24.0 | 28.8 | 33.6 | 5 | 7.5 | 4 | 7.5 | 29.5 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 12 FT | 8 | 9 | 8 | 4 | 6 | 5 | 6 | 30.4 | 24.0 | 28.8 | 33.6 | 5 | 7.5 | 4 | 6 | 28.5 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 14 FT | 8 | 9 | 8 | 5 | 8 | 6 | 7.5 | 33.1 | 28.3 | 33.9 | 39.5 | 5 | 7 | 5 | 6.5 | 28.5 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 16 FT | 8 | 9 | 8 | 5 | 7 | 6 | 7 | 33.1 | 28.3 | 33.9 | 39.5 | 5 | 6.5 | 6 | 7.5 | 31.3 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 18 FT | 9 | 10 | 8 | 5 | 7 | 5 | 6.5 | 28.5 | 25.4 | 30.4 | 35.3 | 5 | 6 | 5 | 7 | 28.5 | 54 | 66 | 78 | 5 | 12 | 0 | | | | | |
| 20 FT | 9 | 10 | 8 | 5 | 6 | 5 | 6 | 28.5 | 29.1 | 34.8 | 40.4 | 6 | 8 | 5 | 6 | 27.6 | 54 | 66 | 78 | 5 | 12 | 0 | | | | | |
| 22 FT | 10 | 11 | 8 | 5 | 6 | 5 | 7 | 28.5 | 26.3 | 31.1 | 36.1 | 6 | 8 | 5 | 7.5 | 27.6 | 55 | 67 | 79 | 5 | 12 | 0 | | | | | |
| 24 FT | 10 | 12 | 8 | 6 | 8 | 5 | 6 | 28.5 | 26.0 | 30.8 | 35.6 | 6 | 8 | 5 | 8.5 | 26.6 | 56 | 68 | 80 | 5 | 12 | 0 | | | | | |
| 26 FT | 11 | 13 | 8 | 6 | 8 | 5 | 7 | 27.6 | 27.5 | 32.4 | 37.3 | 6 | 8 | 5 | 8.5 | 26.6 | 57 | 69 | 81 | 5 | 12 | 0 | | | | | |
| 28 FT | 12 | 13 | 8 | 6 | 7.5 | 5 | 8 | 27.6 | 28.5 | 33.6 | 38.6 | 6 | 7.5 | 5 | 8.5 | 27.6 | 57 | 69 | 81 | 5 | 12 | 0 | | | | | |
| 30 FT | 12 | 14 | 8 | 6 | 7.5 | 5 | 7 | 27.6 | 28.3 | 33.3 | 38.1 | 6 | 7.5 | 5 | 8.5 | 26.6 | 58 | 70 | 82 | 5 | 12 | 0 | | | | | |
| 32 FT | 13 | 14 | 8 | 6 | 7 | 5 | 8 | 26.6 | 29.4 | 34.5 | 39.5 | 6 | 7 | 5 | 8.5 | 27.6 | 58 | 70 | 82 | 5 | 12 | 0 | | | | | |
| 34 FT | 13 | 15 | 8 | 6 | 7 | 5 | 7 | 27.6 | 29.1 | 34.0 | 39.0 | 6 | 7 | 5 | 8.5 | 26.6 | 59 | 71 | 83 | 5 | 12 | 0 | | | | | |
| 36 FT | 14 | 15 | 8 | 6 | 6.5 | 5 | 7.5 | 26.6 | 30.3 | 35.3 | 40.4 | 6 | 7 | 5 | 8.5 | 27.6 | 59 | 71 | 83 | 5 | 12 | 0 | | | | | |
| 38 FT | 14 | 16 | 8 | 6 | 6.5 | 5 | 7 | 26.6 | 30.6 | 35.8 | 40.8 | 6 | 7 | 5 | 8 | 26.6 | 60 | 72 | 84 | 5 | 11.5 | 0 | | | | | |
| 40 FT | 15 | 16 | 8 | 6 | 6.5 | 5 | 7.5 | 32.3 | 31.1 | 36.1 | 41.1 | 6 | 6.5 | 5 | 8 | 27.6 | 60 | 72 | 84 | 5 | 10.5 | 0 | | | | | |
| 42 FT | 15 | 17 | 8 | 6 | 6 | 5 | 7 | 32.3 | 35.3 | 40.9 | 46.5 | 6 | 6.5 | 5 | 7 | 27.6 | 61 | 73 | 85 | 5 | 10 | 0 | | | | | |
| 44 FT | 16 | 17 | 8 | 6 | 6 | 5 | 7 | 32.3 | 36.5 | 42.3 | 48.0 | 6 | 6.5 | 5 | 7 | 27.6 | 61 | 73 | 85 | 5 | 9.5 | 0 | | | | | |
| 46 FT | 16 | 18 | 8 | 6 | 6 | 5 | 6 | 32.3 | 36.3 | 41.9 | 47.5 | 6 | 6.5 | 5 | 6.5 | 27.6 | 62 | 74 | 86 | 5 | 9.5 | 0 | | | | | |
| 48 FT | 17 | 18 | 9 | 6 | 6 | 5 | 7.5 | 32.5 | 33.5 | 38.8 | 43.9 | 6 | 6.5 | 5 | 8 | 27.9 | 62 | 74 | 86 | 5 | 10 | 0 | | | | | |
| 50 FT | 17 | 19 | 9 | 6 | 6 | 5 | 7 | 32.5 | 37.1 | 42.8 | 48.4 | 6 | 6 | 5 | 7.5 | 27.9 | 63 | 75 | 87 | 5 | 9 | 0 | | | | | |

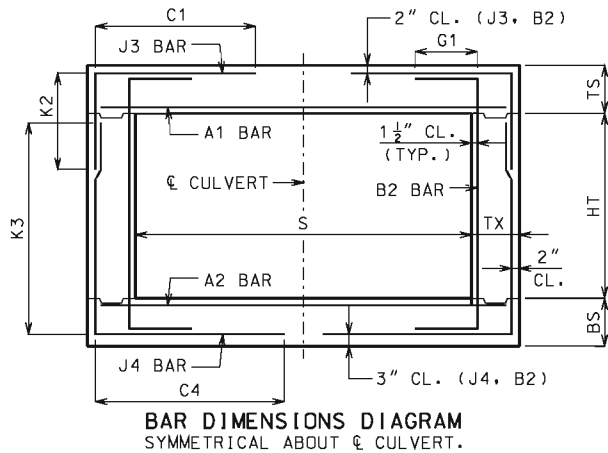
| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|-------|--------|---------|------|------------------|------|------|-------|--------|-----------------------------|------|----|--|-----------|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | HT=9' | HT=10' | | | | | | HT=9' | HT=10' | | | | | | | | | | |
| 1 FT | 11 | 10 | 8 | 5 | 7.5 | 4 | 6 | 57.0 | 27.3 | 29.9 | 5 | 7 | 5 | 6.5 | 58.9 | 114 | 126 | 5 | 12 | 12 | | | | | | | |
| 2 FT | 11 | 10 | 8 | 5 | 7.5 | 5 | 8.5 | 58.9 | 28.5 | 31.3 | 5 | 7 | 5 | 6 | 58.9 | 114 | 126 | 5 | 11 | 12 | | | | | | | |
| 4 FT | 8 | 9 | 9 | 4 | 6 | 5 | 6 | 59.5 | 28.8 | 31.6 | 5 | 7.5 | 5 | 6 | 59.5 | 113 | 125 | 5 | 10.5 | 0 | | | | | | | |
| 6 FT | 8 | 10 | 9 | 4 | 6 | 5 | 6 | 59.5 | 29.0 | 31.9 | 5 | 7 | 5 | 6.5 | 59.5 | 114 | 126 | 5 | 10 | 0 | | | | | | | |
| 8 FT | 8 | 10 | 9 | 4 | 6 | 6 | 7 | 62.3 | 29.0 | 31.9 | 5 | 7 | 5 | 6 | 59.5 | 114 | 126 | 5 | 9 | 0 | | | | | | | |
| 10 FT | 8 | 10 | 9 | 4 | 6 | 5 | 6 | 46.5 | 26.6 | 29.3 | 5 | 7.5 | 5 | 6 | 59.5 | 114 | 126 | 5 | 10 | 0 | | | | | | | |
| 12 FT | 8 | 11 | 9 | 4 | 6 | 6 | 7 | 47.4 | 25.6 | 28.1 | 5 | 7 | 5 | 6 | 59.5 | 115 | 127 | 5 | 9 | 0 | | | | | | | |
| 14 FT | 8 | 11 | 9 | 5 | 8.5 | 6 | 7 | 46.5 | 29.3 | 32.1 | 5 | 6.5 | 6 | 7 | 62.3 | 115 | 127 | 5 | 8.5 | 0 | | | | | | | |
| 16 FT | 9 | 11 | 9 | 5 | 8 | 5 | 6 | 46.5 | 29.5 | 32.4 | 5 | 6.5 | 6 | 6.5 | 62.3 | 115 | 127 | 5 | 8.5 | 0 | | | | | | | |
| 18 FT | 9 | 11 | 9 | 5 | 7 | 6 | 7 | 48.4 | 30.8 | 33.8 | 5 | 6.5 | 6 | 6 | 64.1 | 115 | 127 | 5 | 8.5 | 0 | | | | | | | |
| 20 FT | 10 | 11 | 9 | 5 | 7 | 6 | 7.5 | 50.3 | 31.0 | 34.0 | 5 | 6 | 6 | 6 | 60.5 | 115 | 127 | 5 | 8.5 | 0 | | | | | | | |
| 22 FT | 10 | 12 | 9 | 5 | 6.5 | 6 | 6.5 | 49.3 | 31.3 | 34.3 | 5 | 6 | 6 | 6 | 62.3 | 116 | 128 | 5 | 8 | 0 | | | | | | | |
| 24 FT | 11 | 12 | 9 | 5 | 6 | 6 | 7 | 51.1 | 35.3 | 38.6 | 6 | 8.5 | 6 | 6 | 64.1 | 116 | 128 | 5 | 7.5 | 0 | | | | | | | |
| 26 FT | 11 | 13 | 10 | 5 | 6 | 6 | 7.5 | 48.9 | 33.0 | 36.1 | 5 | 6 | 6 | 6.5 | 60.1 | 117 | 129 | 5 | 8 | 0 | | | | | | | |
| 28 FT | 12 | 13 | 11 | 5 | 6 | 5 | 6.5 | 45.6 | 32.0 | 35.0 | 6 | 8 | 6 | 7 | 54.1 | 117 | 129 | 5 | 7.5 | 0 | | | | | | | |
| 30 FT | 12 | 14 | 11 | 6 | 8 | 5 | 6 | 45.6 | 32.3 | 35.3 | 6 | 8 | 6 | 7 | 56.0 | 118 | 130 | 5 | 7.5 | 0 | | | | | | | |
| 32 FT | 13 | 14 | 12 | 6 | 8 | 5 | 6 | 46.1 | 33.8 | 36.9 | 6 | 7.5 | 6 | 8 | 52.8 | 118 | 130 | 5 | 7 | 0 | | | | | | | |
| 34 FT | 13 | 15 | 12 | 6 | 8 | 5 | 6 | 45.1 | 34.0 | 37.1 | 6 | 7.5 | 6 | 8 | 55.6 | 119 | 131 | 5 | 7 | 0 | | | | | | | |
| 36 FT | 14 | 15 | 12 | 6 | 7.5 | 6 | 8 | 49.9 | 35.6 | 38.9 | 6 | 7.5 | 6 | 7.5 | 54.8 | 119 | 131 | 5 | 7 | 0 | | | | | | | |
| 38 FT | 14 | 16 | 13 | 6 | 7.5 | 5 | 6 | 45.6 | 34.6 | 37.8 | 6 | 7 | 6 | 8 | 54.4 | 120 | 132 | 5 | 6.5 | 0 | | | | | | | |
| 40 FT | 15 | 16 | 13 | 6 | 7.5 | 6 | 8 | 55.3 | 36.1 | 39.4 | 6 | 7 | 6 | 7.5 | 54.4 | 120 | 132 | 5 | 6.5 | 0 | | | | | | | |
| 42 FT | 15 | 17 | 13 | 6 | 7 | 6 | 7.5 | 55.3 | 36.5 | 39.8 | 6 | 7 | 6 | 7.5 | 56.3 | 121 | 133 | 5 | 6.5 | 0 | | | | | | | |
| 44 FT | 16 | 17 | 14 | 6 | 7 | 6 | 8 | 55.9 | 38.1 | 41.5 | 6 | 7 | 6 | 7.5 | 53.9 | 121 | 133 | 5 | 6 | 0 | | | | | | | |
| 46 FT | 16 | 17 | 14 | 6 | 7 | 6 | 7.5 | 55.9 | 38.1 | 41.5 | 6 | 6.5 | 6 | 7 | 53.9 | 121 | 133 | 5 | 6 | 0 | | | | | | | |
| 48 FT | 16 | 18 | 14 | 6 | 6.5 | 6 | 7 | 55.9 | 37.0 | 40.3 | 6 | 6.5 | 6 | 7.5 | 55.9 | 122 | 134 | 5 | 6 | 0 | | | | | | | |
| 50 FT | 17 | 18 | 15 | 6 | 6.5 | 6 | 8 | 56.4 | 41.4 | 45.0 | 6 | 6.5 | 6 | 7.5 | 53.5 | 122 | 134 | 6 | 8 | 0 | | | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT | | | | | | | | | | | | | |
|-----------------|------------------|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------------------|------------------------------------|------|------|-------|-------|---------|------|------|-----------|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | | B2 BARS | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | HT=4' | HT=5' | HT=6' | SIZE | SPA. | SIZE | SPA. | C4 | HT=4' | HT=5' | HT=6' | SIZE | SPA. | G1 | | | | | |
| 1 FT | 12 | 9 | 8 | 5 | 7 | 4 | 8.5 | 63.5 | 28.1 | 33.5 | 38.8 | 5 | 7.5 | 5 | 6 | 44.8 | 53 | 65 | 77 | 5 | 12 | 12 | | | | | |
| 2 FT | 12 | 9 | 8 | 5 | 7 | 4 | 8 | 63.5 | 28.1 | 33.5 | 38.8 | 5 | 7 | 6 | 7.5 | 43.6 | 53 | 65 | 77 | 5 | 12 | 12 | | | | | |
| 4 FT | 8 | 8 | 8 | 5 | 8 | 6 | 7.5 | 38.5 | 32.5 | 39.0 | 45.6 | 5 | 6.5 | 6 | 6 | 38.5 | 52 | 64 | 76 | 5 | 12 | 0 | | | | | |
| 6 FT | 8 | 8 | 8 | 5 | 8.5 | 6 | 7.5 | 37.5 | 32.5 | 39.0 | 45.6 | 5 | 7 | 6 | 6 | 36.4 | 52 | 64 | 76 | 5 | 12 | 0 | | | | | |
| 8 FT | 8 | 8 | 8 | 5 | 8 | 6 | 7.5 | 36.4 | 32.5 | 39.0 | 45.6 | 5 | 6.5 | 6 | 6 | 35.4 | 52 | 64 | 76 | 5 | 12 | 0 | | | | | |
| 10 FT | 8 | 8 | 8 | 5 | 8.5 | 6 | 7.5 | 34.4 | 32.5 | 39.0 | 45.6 | 5 | 7 | 6 | 6 | 34.4 | 52 | 64 | 76 | 5 | 12 | 0 | | | | | |
| 12 FT | 8 | 9 | 8 | 5 | 7.5 | 6 | 7.5 | 34.4 | 32.4 | 38.9 | 45.4 | 5 | 6.5 | 6 | 7.5 | 32.3 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 14 FT | 8 | 9 | 8 | 5 | 6.5 | 6 | 6.5 | 34.4 | 32.4 | 38.9 | 45.4 | 6 | 8 | 6 | 7 | 32.3 | 53 | 65 | 77 | 5 | 12 | 0 | | | | | |
| 16 FT | 9 | 10 | 8 | 5 | 6 | 5 | 6 | 30.1 | 29.1 | 34.8 | 40.4 | 6 | 8 | 5 | 6.5 | 28.1 | 54 | 66 | 78 | 5 | 12 | 0 | | | | | |
| 18 FT | 9 | 11 | 8 | 6 | 7.5 | 6 | 7 | 33.3 | 29.6 | 35.3 | 40.9 | 6 | 7.5 | 5 | 7.5 | 27.0 | 55 | 67 | 79 | 5 | 12 | 0 | | | | | |
| 20 FT | 10 | 12 | 8 | 6 | 7.5 | 5 | 6 | 29.1 | 26.0 | 30.8 | 35.6 | 6 | 7.5 | 5 | 8.5 | 26.0 | 56 | 68 | 80 | 5 | 12 | 0 | | | | | |
| 22 FT | 11 | 13 | 8 | 6 | 7 | 5 | 6.5 | 28.1 | 27.5 | 32.4 | 37.3 | 6 | 7 | 5 | 8.5 | 26.0 | 57 | 69 | 81 | 5 | 12 | 0 | | | | | |
| 24 FT | 12 | 13 | 8 | 6 | 7 | 5 | 7.5 | 27.0 | 32.6 | 38.4 | 44.1 | 6 | 7 | 5 | 8 | 26.0 | 57 | 69 | 81 | 5 | 12 | 0 | | | | | |
| 26 FT | 13 | 14 | 8 | 6 | 7 | 5 | 8 | 27.0 | 29.4 | 34.5 | 39.5 | 6 | 7 | 5 | 8.5 | 26.0 | 58 | 70 | 82 | 5 | 12 | 0 | | | | | |
| 28 FT | 13 | 15 | 8 | 6 | 6.5 | 5 | 7 | 27.0 | 29.1 | 34.0 | 39.0 | 6 | 6.5 | 5 | 8.5 | 26.0 | 59 | 71 | 83 | 5 | 12 | 0 | | | | | |
| 30 FT | 14 | 15 | 8 | 6 | 6 | 5 | 7.5 | 26.0 | 30.3 | 35.3 | 40.4 | 6 | 6.5 | 5 | 8.5 | 26.0 | 59 | 71 | 83 | 5 | 12 | 0 | | | | | |
| 32 FT | 15 | 16 | 8 | 6 | 6 | 5 | 7.5 | 31.3 | 35.5 | 41.3 | 47.0 | 6 | 6.5 | 5 | 8 | 26.0 | 60 | 72 | 84 | 5 | 12 | 0 | | | | | |
| 34 FT | 15 | 17 | 8 | 6 | 6 | 5 | 7 | 31.3 | 31.5 | 36.5 | 41.6 | 6 | 6.5 | 5 | 7 | 26.0 | 61 | 73 | 85 | 5 | 12 | 0 | | | | | |
| 36 FT | 16 | 17 | 8 | 6 | 6 | 5 | 7 | 31.3 | 32.6 | 37.9 | 43.0 | 6 | 6 | 5 | 7 | 26.0 | 61 | 73 | 85 | 5 | 12 | 0 | | | | | |
| 38 FT | 16 | 18 | 8 | 7 | 7.5 | 5 | 7 | 31.3 | 36.3 | 41.9 | 47.5 | 6 | 6 | 5 | 6.5 | 26.0 | 62 | 74 | 86 | 5 | 11.5 | 0 | | | | | |
| 40 FT | 17 | 18 | 8 | 7 | 7.5 | 5 | 6.5 | 31.3 | 37.5 | 43.3 | 49.0 | 6 | 6 | 5 | 6.5 | 26.0 | 62 | 74 | 86 | 5 | 10.5 | 0 | | | | | |
| 42 FT | 17 | 19 | 8 | 7 | 7 | 5 | 6.5 | 31.3 | 37.1 | 42.8 | 48.4 | 6 | 6 | 5 | 6.5 | 26.0 | 63 | 75 | 87 | 5 | 10 | 0 | | | | | |
| 44 FT | 18 | 19 | 8 | 7 | 7 | 5 | 6.5 | 30.1 | 38.4 | 44.1 | 49.9 | 7 | 7.5 | 5 | 6.5 | 26.0 | 63 | 75 | 87 | 5 | 9.5 | 0 | | | | | |
| 46 FT | 18 | 20 | 8 | 7 | 7 | 5 | 6 | 31.3 | 38.1 | 43.8 | 49.4 | 7 | 7.5 | 5 | 6 | 26.0 | 64 | 76 | 88 | 5 | 9.5 | 0 | | | | | |
| 48 FT | 19 | 20 | 8 | 7 | 7 | 5 | 6 | 31.3 | 39.4 | 45.1 | 50.9 | 7 | 7.5 | 5 | 6 | 26.0 | 64 | 76 | 88 | 5 | 9.5 | 0 | | | | | |
| 50 FT | 19 | 20 | 8 | 7 | 6.5 | 5 | 6 | 31.3 | 39.4 | 45.1 | 50.9 | 7 | 7 | 6 | 7.5 | 29.1 | 64 | 76 | 88 | 5 | 9.5 | 0 | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|--------|--------|---------|------|------------------|------------------------------|------|--------|--------|---------|------|----|--|-----------|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | HT=10' | HT=11' | | | | | | HT=10' | HT=11' | | | | | | | | | | |
| 1 FT | 11 | 10 | 8 | 5 | 6.5 | 5 | 7.5 | 65.5 | 31.3 | 34.0 | 5 | 6.5 | 6 | 6.5 | 66.5 | 126 | 138 | 5 | 9.5 | 12 | | | | | | | |
| 2 FT | 11 | 10 | 8 | 5 | 6.5 | 5 | 7 | 65.5 | 31.3 | 34.0 | 5 | 6 | 6 | 6 | 66.5 | 126 | 138 | 5 | 9.5 | 12 | | | | | | | |
| 4 FT | 8 | 9 | 9 | 5 | 7.5 | 6 | 7 | 68.3 | 33.0 | 36.0 | 5 | 6 | 6 | 6 | 68.3 | 125 | 137 | 5 | 8.5 | 0 | | | | | | | |
| 6 FT | 8 | 10 | 9 | 5 | 8.5 | 6 | 7 | 68.3 | 30.6 | 33.4 | 5 | 7 | 6 | 6.5 | 68.3 | 126 | 138 | 5 | 8.5 | 0 | | | | | | | |
| 8 FT | 8 | 10 | 9 | 5 | 8 | 6 | 7 | 68.3 | 33.3 | 36.3 | 5 | 7 | 6 | 6 | 68.3 | 126 | 138 | 5 | 8.5 | 0 | | | | | | | |
| 10 FT | 8 | 10 | 9 | 5 | 8.5 | 6 | 7 | 52.5 | 30.6 | 33.4 | 5 | 7 | 6 | 6 | 68.3 | 126 | 138 | 5 | 8.5 | 0 | | | | | | | |
| 12 FT | 8 | 10 | 9 | 5 | 7.5 | 6 | 6.5 | 50.4 | 33.3 | 36.3 | 5 | 6.5 | 6 | 6 | 65.1 | 126 | 138 | 5 | 8.5 | 0 | | | | | | | |
| 14 FT | 9 | 11 | 9 | 5 | 7 | 6 | 7 | 52.5 | 31.0 | 33.8 | 5 | 6.5 | 6 | 6 | 69.3 | 127 | 139 | 5 | 8.5 | 0 | | | | | | | |
| 16 FT | 9 | 11 | 9 | 5 | 6 | 6 | 6 | 50.4 | 33.8 | 36.8 | 6 | 8 | 6 | 6 | 64.0 | 127 | 139 | 5 | 8.5 | 0 | | | | | | | |
| 18 FT | 10 | 12 | 9 | 5 | 6 | 6 | 6 | 52.5 | 34.3 | 37.3 | 6 | 8 | 6 | 6 | 68.3 | 128 | 140 | 5 | 8 | 0 | | | | | | | |
| 20 FT | 11 | 12 | 10 | 5 | 6 | 5 | 6 | 48.8 | 31.8 | 34.5 | 6 | 7.5 | 6 | 6.5 | 58.3 | 128 | 140 | 5 | 8 | 0 | | | | | | | |
| 22 FT | 11 | 13 | 10 | 6 | 8 | 6 | 7 | 50.9 | 33.4 | 36.3 | 6 | 7.5 | 6 | 6.5 | 60.4 | 129 | 141 | 5 | 7.5 | 0 | | | | | | | |
| 24 FT | 12 | 13 | 11 | 6 | 7.5 | 6 | 8 | 51.4 | 33.6 | 36.5 | 6 | 7 | 6 | 7 | 56.8 | 129 | 141 | 5 | 7.5 | 0 | | | | | | | |
| 26 FT | 12 | 14 | 11 | 6 | 7 | 6 | 7.5 | 50.3 | 33.9 | 36.8 | 6 | 7 | 6 | 7 | 57.8 | 130 | 142 | 5 | 7.5 | 0 | | | | | | | |
| 28 FT | 13 | 15 | 12 | 6 | 7.5 | 6 | 8 | 50.8 | 34.4 | 37.3 | 6 | 7 | 6 | 7.5 | 57.3 | 131 | 143 | 5 | 7 | 0 | | | | | | | |
| 30 FT | 14 | 15 | 12 | 6 | 7 | 6 | 7.5 | 51.9 | 36.0 | 39.0 | 6 | 6.5 | 6 | 7 | 57.3 | 131 | 143 | 5 | 7 | 0 | | | | | | | |
| 32 FT | 14 | 16 | 13 | 6 | 7 | 6 | 8 | 51.3 | 36.3 | 39.3 | 6 | 6.5 | 6 | 7.5 | 56.6 | 132 | 144 | 5 | 6.5 | 0 | | | | | | | |
| 34 FT | 15 | 16 | 13 | 6 | 6.5 | 6 | 7.5 | 57.8 | 36.5 | 39.5 | 6 | 6.5 | 6 | 7 | 55.6 | 132 | 144 | 5 | 6.5 | 0 | | | | | | | |
| 36 FT | 15 | 17 | 13 | 6 | 6.5 | 6 | 6.5 | 57.8 | 36.8 | 39.8 | 6 | 6.5 | 6 | 7 | 57.8 | 133 | 145 | 5 | 6.5 | 0 | | | | | | | |
| 38 FT | 16 | 18 | 14 | 6 | 6.5 | 6 | 7.5 | 58.3 | 37.3 | 40.3 | 6 | 6.5 | 6 | 7.5 | 57.3 | 134 | 146 | 5 | 6 | 0 | | | | | | | |
| 40 FT | 16 | 18 | 14 | 6 | 6 | 6 | 7 | 58.3 | 37.3 | 40.3 | 6 | 6 | 6 | 7 | 57.3 | 134 | 146 | 5 | 6 | 0 | | | | | | | |
| 42 FT | 17 | 19 | 15 | 6 | 6 | 6 | 7 | 58.9 | 42.3 | 45.6 | 6 | 6 | 6 | 7.5 | 56.6 | 135 | 147 | 6 | 8 | 0 | | | | | | | |
| 44 FT | 17 | 19 | 15 | 6 | 6 | 6 | 6.5 | 57.8 | 42.3 | 45.6 | 6 | 6 | 6 | 7 | 56.6 | 135 | 147 | 6 | 8 | 0 | | | | | | | |
| 46 FT | 18 | 19 | 15 | 6 | 6 | 6 | 7 | 58.9 | 42.5 | 45.9 | 7 | 8 | 6 | 6 | 56.6 | 135 | 147 | 6 | 8 | 0 | | | | | | | |
| 48 FT | 18 | 20 | 16 | 7 | 8 | 6 | 7 | 58.3 | 42.9 | 46.3 | 7 | 8 | 6 | 7 | 56.0 | 136 | 148 | 6 | 8 | 0 | | | | | | | |
| 50 FT | 19 | 21 | 16 | 7 | 7.5 | 6 | 7 | 59.4 | 43.4 | 46.8 | 7 | 8 | 6 | 7 | 58.3 | 137 | 149 | 6 | 8 | 0 | | | | | | | |

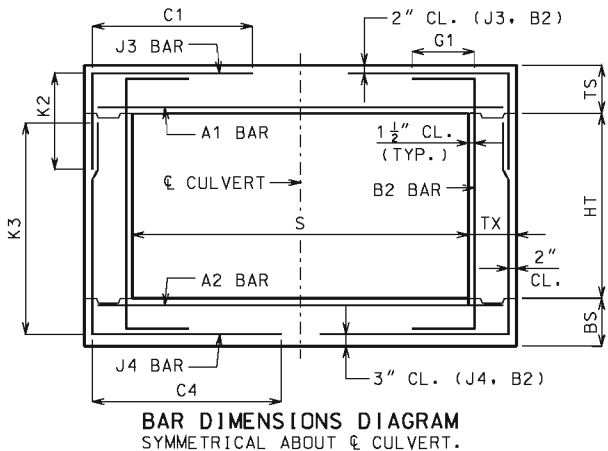
| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT | | | | | | | | | |
|-----------------|------------------|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------------------|---------|------|------|-------|-------|------------------------------------|---------|------|-----------|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | | A2 BARS | | J4 BARS | | | | | | B2 BARS | | | | | | | | |
| | | | | | | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | HT=5' | HT=6' | HT=7' | SIZE | SPA. | SIZE | SPA. | C4 | HT=5' | HT=6' | HT=7' | SIZE | SPA. | G1 | | | | | | |
| 1 FT | 12 | 9 | 8 | 5 | 6.5 | 4 | 7 | 69.6 | 28.1 | 32.5 | 37.0 | 5 | 6.5 | 6 | 7.5 | 54.5 | 65 | 77 | 89 | 5 | 12 | 12 | | | | | | |
| 2 FT | 12 | 9 | 8 | 5 | 6.5 | 4 | 7 | 69.6 | 28.1 | 32.5 | 37.0 | 5 | 6 | 6 | 7 | 48.8 | 65 | 77 | 89 | 5 | 12 | 12 | | | | | | |
| 4 FT | 8 | 9 | 8 | 5 | 6.5 | 6 | 7 | 42.9 | 32.4 | 37.8 | 43.3 | 5 | 6 | 6 | 7.5 | 42.9 | 65 | 77 | 89 | 5 | 12 | 0 | | | | | | |
| 6 FT | 8 | 9 | 8 | 5 | 7 | 6 | 7.5 | 40.6 | 32.4 | 37.8 | 43.3 | 5 | 6 | 6 | 7 | 39.5 | 65 | 77 | 89 | 5 | 12 | 0 | | | | | | |
| 8 FT | 8 | 10 | 8 | 5 | 6.5 | 6 | 7 | 39.5 | 24.1 | 28.0 | 32.0 | 5 | 6 | 5 | 6.5 | 33.6 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | |
| 10 FT | 8 | 10 | 8 | 5 | 7 | 6 | 7.5 | 37.1 | 24.1 | 28.0 | 32.0 | 5 | 6.5 | 4 | 6 | 31.4 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | |
| 12 FT | 8 | 10 | 8 | 5 | 6 | 6 | 6 | 37.1 | 28.5 | 33.1 | 37.9 | 6 | 8 | 5 | 6.5 | 30.1 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | |
| 14 FT | 9 | 10 | 8 | 6 | 7.5 | 6 | 7 | 34.8 | 29.6 | 34.4 | 39.3 | 6 | 7 | 5 | 6 | 30.1 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | |
| 16 FT | 9 | 11 | 8 | 6 | 7 | 6 | 6 | 34.8 | 29.3 | 33.9 | 38.6 | 6 | 6.5 | 5 | 7 | 29.0 | 67 | 79 | 91 | 5 | 12 | 0 | | | | | | |
| 18 FT | 10 | 12 | 8 | 6 | 6.5 | 6 | 6.5 | 33.6 | 30.0 | 34.8 | 39.4 | 6 | 6.5 | 5 | 7.5 | 29.0 | 68 | 80 | 92 | 5 | 12 | 0 | | | | | | |
| 20 FT | 11 | 13 | 8 | 6 | 6 | 6 | 7 | 33.6 | 31.6 | 36.4 | 41.3 | 6 | 6 | 5 | 8 | 29.0 | 69 | 81 | 93 | 5 | 12 | 0 | | | | | | |
| 22 FT | 12 | 14 | 8 | 6 | 6 | 5 | 6 | 29.0 | 32.4 | 37.3 | 42.0 | 6 | 6 | 5 | 8.5 | 27.9 | 70 | 82 | 94 | 5 | 12 | 0 | | | | | | |
| 24 FT | 13 | 15 | 8 | 6 | 6 | 5 | 6 | 29.0 | 29.0 | 33.3 | 37.5 | 6 | 6 | 5 | 8.5 | 27.9 | 71 | 83 | 95 | 5 | 12 | 0 | | | | | | |
| 26 FT | 14 | 16 | 8 | 6 | 6 | 5 | 6 | 29.0 | 30.6 | 34.9 | 39.3 | 6 | 6 | 5 | 8 | 27.9 | 72 | 84 | 96 | 5 | 12 | 0 | | | | | | |
| 28 FT | 15 | 16 | 8 | 7 | 7.5 | 5 | 6.5 | 33.6 | 35.3 | 40.1 | 45.1 | 7 | 8 | 5 | 8 | 27.9 | 72 | 84 | 96 | 5 | 12 | 0 | | | | | | |
| 30 FT | 15 | 17 | 8 | 7 | 7 | 6 | 8 | 37.1 | 35.6 | 40.6 | 45.5 | 7 | 7.5 | 5 | 7 | 27.9 | 73 | 85 | 97 | 5 | 11.5 | 0 | | | | | | |
| 32 FT | 16 | 17 | 8 | 7 | 7 | 5 | 6 | 32.5 | 36.1 | 41.0 | 45.9 | 7 | 7.5 | 5 | 6.5 | 27.9 | 73 | 85 | 97 | 5 | 10 | 0 | | | | | | |
| 34 FT | 17 | 18 | 8 | 7 | 7 | 5 | 6 | 32.5 | 37.8 | 42.9 | 47.9 | 7 | 7.5 | 5 | 6.5 | 29.0 | 74 | 86 | 98 | 5 | 9.5 | 0 | | | | | | |
| 36 FT | 17 | 19 | 9 | 7 | 7 | 5 | 6 | 33.9 | 37.3 | 42.3 | 47.1 | 7 | 7.5 | 5 | 7.5 | 29.3 | 75 | 87 | 99 | 5 | 10.5 | 0 | | | | | | |
| 38 FT | 18 | 20 | 9 | 7 | 7 | 5 | 6 | 33.9 | 38.1 | 43.0 | 48.0 | 7 | 7.5 | 5 | 7 | 29.3 | 76 | 88 | 100 | 5 | 9.5 | 0 | | | | | | |
| 40 FT | 19 | 20 | 9 | 7 | 6.5 | 5 | 6.5 | 33.9 | 39.5 | 44.5 | 49.5 | 7 | 7 | 5 | 7 | 29.3 | 76 | 88 | 100 | 5 | 8.5 | 0 | | | | | | |
| 42 FT | 19 | 21 | 10 | 7 | 6.5 | 5 | 6.5 | 34.3 | 39.9 | 45.0 | 50.0 | 7 | 7 | 5 | 7.5 | 29.5 | 77 | 89 | 101 | 5 | 10 | 0 | | | | | | |
| 44 FT | 20 | 21 | 10 | 7 | 6.5 | 5 | 6.5 | 34.3 | 40.4 | 45.4 | 50.4 | 7 | 6.5 | 5 | 7.5 | 29.5 | 77 | 89 | 101 | 5 | 9.5 | 0 | | | | | | |
| 46 FT | 21 | 22 | 10 | 7 | 6.5 | 5 | 6.5 | 34.3 | 41.1 | 46.3 | 51.3 | 7 | 7 | 5 | 7 | 29.5 | 78 | 90 | 102 | 5 | 8.5 | 0 | | | | | | |
| 48 FT | 21 | 22 | 10 | 7 | 6 | 5 | 6.5 | 34.3 | 41.1 | 46.3 | 51.3 | 7 | 6.5 | 5 | 7 | 29.5 | 78 | 90 | 102 | 5 | 8 | 0 | | | | | | |
| 50 FT | 22 | 23 | 10 | 7 | 6 | 5 | 6.5 | 34.3 | 42.0 | 47.0 | 52.1 | 7 | 6.5 | 5 | 6.5 | 30.6 | 79 | 91 | 103 | 5 | 8 | 0 | | | | | | |

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT | | | | | | | | | |
|-----------------|---------------------|----|----|---------------|------|---------|------|------|--------|--------|---------|------|------------------|------|------|--------|--------|---------|------------------------------|----|--|-----------|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | | | | | | |
| | | | | | | | | | HT=11' | HT=12' | | | | | | HT=11' | HT=12' | | | | | | | | | | | |
| 1 FT | 11 | 11 | 8 | 5 | 6 | 5 | 6 | 70.8 | 31.3 | 33.8 | 5 | 6 | 6 | 6 | 73.1 | 139 | 151 | 5 | 9.5 | 12 | | | | | | | | |
| 2 FT | 11 | 12 | 8 | 6 | 8.5 | 6 | 7 | 73.1 | 33.0 | 35.6 | 5 | 6 | 6 | 6 | 73.1 | 140 | 152 | 5 | 9.5 | 12 | | | | | | | | |
| 4 FT | 8 | 10 | 9 | 5 | 6 | 6 | 6.5 | 73.8 | 33.4 | 36.1 | 6 | 8 | 6 | 6 | 73.8 | 138 | 150 | 5 | 8.5 | 0 | | | | | | | | |
| 6 FT | 8 | 11 | 9 | 5 | 7 | 6 | 6.5 | 73.8 | 32.1 | 34.8 | 5 | 6 | 6 | 6 | 73.8 | 139 | 151 | 5 | 8.5 | 0 | | | | | | | | |
| 8 FT | 9 | 11 | 9 | 5 | 7 | 6 | 7 | 73.8 | 30.9 | 33.4 | 5 | 6 | 6 | 6 | 73.8 | 139 | 151 | 5 | 8.5 | 0 | | | | | | | | |
| 10 FT | 9 | 11 | 9 | 5 | 7.5 | 6 | 7 | 58.5 | 30.9 | 33.4 | 5 | 6.5 | 6 | 6 | 73.8 | 139 | 151 | 5 | 8.5 | 0 | | | | | | | | |
| 12 FT | 9 | 12 | 9 | 5 | 6.5 | 6 | 6 | 56.1 | 34.0 | 36.8 | 5 | 6 | 6 | 6 | 73.8 | 140 | 152 | 5 | 8.5 | 0 | | | | | | | | |
| 14 FT | 10 | 12 | 9 | 5 | 6 | 6 | 6 | 57.4 | 34.3 | 37.0 | 6 | 8 | 6 | 6 | 73.8 | 140 | 152 | 5 | 7.5 | 0 | | | | | | | | |
| 16 FT | 10 | 12 | 10 | 6 | 8 | 6 | 6.5 | 53.1 | 34.3 | 37.0 | 6 | 7 | 6 | 6 | 63.8 | 140 | 152 | 5 | 8 | 0 | | | | | | | | |
| 18 FT | 11 | 13 | 10 | 6 | 7.5 | 6 | 6.5 | 54.3 | 36.3 | 39.1 | 6 | 7 | 6 | 6 | 64.9 | 141 | 153 | 5 | 7.5 | 0 | | | | | | | | |
| 20 FT | 11 | 13 | 11 | 6 | 6.5 | 6 | 6.5 | 52.4 | 36.3 | 39.1 | 6 | 6.5 | 6 | 7 | 59.5 | 141 | 153 | 5 | 7.5 | 0 | | | | | | | | |
| 22 FT | 12 | 14 | 12 | 6 | 7 | 6 | 8 | 52.8 | 33.6 | 36.3 | 6 | 6.5 | 6 | 7.5 | 58.8 | 142 | 154 | 5 | 7 | 0 | | | | | | | | |
| 24 FT | 13 | 15 | 12 | 6 | 6.5 | 6 | 7.5 | 54.0 | 37.3 | 40.1 | 6 | 6.5 | 6 | 7 | 60.0 | 143 | 155 | 5 | 7 | 0 | | | | | | | | |
| 26 FT | 14 | 15 | 13 | 6 | 6.5 | 6 | 7.5 | 54.5 | 35.9 | 38.6 | 6 | 6 | 6 | 6.5 | 56.9 | 143 | 155 | 5 | 6.5 | 0 | | | | | | | | |
| 28 FT | 14 | 16 | 13 | 6 | 6 | 6 | 7 | 53.3 | 39.3 | 42.3 | 6 | 6 | 6 | 7 | 58.1 | 144 | 156 | 5 | 6.5 | 0 | | | | | | | | |
| 30 FT | 15 | 17 | 13 | 6 | 6 | 6 | 6.5 | 60.5 | 39.8 | 42.8 | 6 | 6 | 6 | 6.5 | 60.5 | 145 | 157 | 5 | 6.5 | 0 | | | | | | | | |
| 32 FT | 16 | 17 | 14 | 6 | 6 | 6 | 7 | 61.0 | 40.0 | 43.0 | 6 | 6 | 6 | 6 | 57.4 | 145 | 157 | 5 | 6 | 0 | | | | | | | | |
| 34 FT | 16 | 18 | 14 | 7 | 8 | 6 | 6.5 | 61.0 | 40.3 | 43.3 | 7 | 7.5 | 6 | 6.5 | 58.5 | 146 | 158 | 5 | 6 | 0 | | | | | | | | |
| 36 FT | 17 | 19 | 15 | 6 | 6 | 6 | 7 | 60.3 | 42.4 | 45.5 | 7 | 8 | 6 | 6.5 | 59.0 | 147 | 159 | 6 | 8 | 0 | | | | | | | | |
| 38 FT | 18 | 19 | 15 | 7 | 7.5 | 6 | 6.5 | 61.5 | 42.6 | 45.8 | 7 | 7.5 | 6 | 6.5 | 57.8 | 147 | 159 | 6 | 8 | 0 | | | | | | | | |
| 40 FT | 18 | 20 | 15 | 7 | 7.5 | 6 | 6 | 61.5 | 42.9 | 46.0 | 7 | 7.5 | 6 | 6.5 | 60.3 | 148 | 160 | 6 | 8 | 0 | | | | | | | | |
| 42 FT | 19 | 21 | 16 | 7 | 7.5 | 6 | 6.5 | 62.0 | 43.4 | 46.5 | 7 | 7.5 | 6 | 6.5 | 59.5 | 149 | 161 | 6 | 8 | 0 | | | | | | | | |
| 44 FT | 19 | 21 | 16 | 7 | 7 | 6 | 6 | 62.0 | 43.4 | 46.5 | 7 | 7 | 6 | 6.5 | 59.5 | 149 | 161 | 6 | 8 | 0 | | | | | | | | |
| 46 FT | 20 | 22 | 17 | 7 | 7 | 6 | 6.5 | 62.5 | 45.6 | 48.9 | 7 | 7 | 6 | 6.5 | 58.8 | 150 | 162 | 6 | 7.5 | 0 | | | | | | | | |
| 48 FT | 20 | 22 | 17 | 7 | 7 | 6 | 6 | 61.3 | 45.6 | 48.9 | 7 | 7 | 6 | 6.5 | 58.8 | 150 | 162 | 6 | 7.5 | 0 | | | | | | | | |
| 50 FT | 21 | 23 | 18 | 7 | 7 | 6 | 6.5 | 63.0 | 46.1 | 49.4 | 7 | 7 | 6 | 6.5 | 59.3 | 151 | 163 | 6 | 7 | 0 | | | | | | | | |



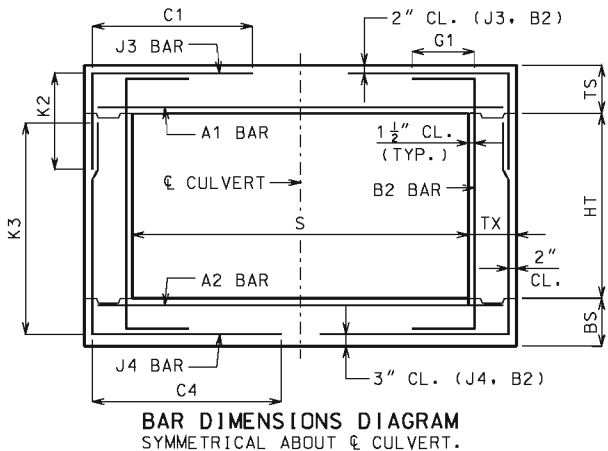
| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------------------|------|------|------|-------|---------|------------------------------------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | | | | | | |
| | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 5 | 6 | 4 | 6 | 75.5 | 28.1 | 32.5 | 37.0 | 5 | 6 | 6 | 6.5 | 52.5 | 65 | 77 | 89 | 5 | 12 | 12 | | | | | | | | | | | |
| 2 FT | 12 | 10 | 8 | 5 | 6 | 5 | 7.5 | 76.8 | 32.4 | 37.4 | 42.4 | 5 | 6 | 5 | 6.5 | 44.8 | 66 | 78 | 90 | 5 | 12 | 12 | | | | | | | | | | | |
| 4 FT | 8 | 9 | 8 | 6 | 8 | 7 | 6.5 | 44.8 | 32.4 | 37.8 | 43.3 | 6 | 7.5 | 6 | 7 | 42.3 | 65 | 77 | 89 | 5 | 12 | 0 | | | | | | | | | | | |
| 6 FT | 8 | 10 | 8 | 6 | 8.5 | 6 | 6 | 42.3 | 28.5 | 33.1 | 37.9 | 6 | 7.5 | 5 | 6.5 | 35.9 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | | | | | | |
| 8 FT | 8 | 10 | 8 | 6 | 7.5 | 7 | 6 | 43.5 | 28.5 | 33.1 | 37.9 | 6 | 7 | 5 | 6.5 | 33.3 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | | | | | | |
| 10 FT | 9 | 10 | 8 | 6 | 7 | 6 | 6.5 | 38.4 | 29.6 | 34.4 | 39.3 | 6 | 6.5 | 6 | 7 | 35.9 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | | | | | | |
| 12 FT | 9 | 10 | 8 | 6 | 7.5 | 6 | 6.5 | 35.9 | 29.6 | 34.4 | 39.3 | 6 | 6.5 | 6 | 7 | 34.5 | 66 | 78 | 90 | 5 | 12 | 0 | | | | | | | | | | | |
| 14 FT | 9 | 11 | 8 | 6 | 6.5 | 7 | 6 | 39.6 | 29.3 | 33.9 | 38.6 | 6 | 6 | 5 | 7 | 29.5 | 67 | 79 | 91 | 5 | 12 | 0 | | | | | | | | | | | |
| 16 FT | 10 | 12 | 8 | 6 | 6 | 6 | 6 | 34.5 | 30.0 | 34.8 | 39.4 | 6 | 6 | 5 | 7.5 | 28.1 | 68 | 80 | 92 | 5 | 12 | 0 | | | | | | | | | | | |
| 18 FT | 11 | 13 | 8 | 7 | 7.5 | 6 | 6.5 | 33.3 | 31.6 | 36.4 | 41.3 | 7 | 7.5 | 5 | 8 | 28.1 | 69 | 81 | 93 | 5 | 12 | 0 | | | | | | | | | | | |
| 20 FT | 12 | 14 | 8 | 7 | 7.5 | 6 | 7 | 33.3 | 32.4 | 37.3 | 42.0 | 7 | 7.5 | 5 | 8.5 | 26.9 | 70 | 82 | 94 | 5 | 12 | 0 | | | | | | | | | | | |
| 22 FT | 13 | 15 | 8 | 7 | 7 | 6 | 7.5 | 32.0 | 33.3 | 38.0 | 42.8 | 7 | 7.5 | 5 | 8.5 | 26.9 | 71 | 83 | 95 | 5 | 12 | 0 | | | | | | | | | | | |
| 24 FT | 14 | 16 | 8 | 7 | 7 | 6 | 8 | 30.8 | 34.0 | 38.8 | 43.6 | 7 | 7.5 | 5 | 8 | 26.9 | 72 | 84 | 96 | 5 | 12 | 0 | | | | | | | | | | | |
| 26 FT | 15 | 17 | 8 | 7 | 6.5 | 6 | 8 | 37.1 | 35.6 | 40.6 | 45.5 | 7 | 7 | 5 | 7 | 26.9 | 73 | 85 | 97 | 5 | 12 | 0 | | | | | | | | | | | |
| 28 FT | 16 | 18 | 8 | 7 | 6.5 | 6 | 8.5 | 35.9 | 36.5 | 41.4 | 46.4 | 7 | 7 | 5 | 6.5 | 26.9 | 74 | 86 | 98 | 5 | 12 | 0 | | | | | | | | | | | |
| 30 FT | 17 | 18 | 8 | 7 | 6.5 | 5 | 6 | 32.0 | 37.8 | 42.9 | 47.9 | 7 | 6.5 | 5 | 6.5 | 26.9 | 74 | 86 | 98 | 5 | 11.5 | 0 | | | | | | | | | | | |
| 32 FT | 18 | 19 | 8 | 7 | 6.5 | 5 | 6 | 32.0 | 38.6 | 43.6 | 48.8 | 7 | 6.5 | 5 | 6.5 | 26.9 | 75 | 87 | 99 | 5 | 10 | 0 | | | | | | | | | | | |
| 34 FT | 18 | 20 | 8 | 7 | 6 | 6 | 7.5 | 35.9 | 38.1 | 43.0 | 48.0 | 7 | 6.5 | 5 | 6 | 26.9 | 76 | 88 | 100 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 36 FT | 19 | 21 | 8 | 7 | 6 | 6 | 7.5 | 35.9 | 39.9 | 45.0 | 50.0 | 7 | 6.5 | 6 | 7.5 | 30.8 | 77 | 89 | 101 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 38 FT | 20 | 21 | 8 | 7 | 6 | 6 | 7.5 | 35.9 | 44.1 | 49.6 | 55.3 | 7 | 6.5 | 6 | 7.5 | 30.8 | 77 | 89 | 101 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 40 FT | 21 | 22 | 8 | 7 | 6 | 6 | 7 | 35.9 | 45.1 | 50.6 | 56.1 | 7 | 6.5 | 6 | 7 | 30.8 | 78 | 90 | 102 | 5 | 9 | 0 | | | | | | | | | | | |
| 42 FT | 21 | 23 | 9 | 8 | 7.5 | 5 | 6 | 33.5 | 41.6 | 46.6 | 51.6 | 7 | 6 | 5 | 6 | 28.4 | 79 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | | | |
| 44 FT | 22 | 23 | 9 | 8 | 7.5 | 6 | 7.5 | 37.4 | 42.0 | 47.0 | 52.1 | 7 | 6 | 5 | 6 | 28.4 | 79 | 91 | 103 | 5 | 8.5 | 0 | | | | | | | | | | | |
| 46 FT | 23 | 24 | 10 | 8 | 7.5 | 5 | 6.5 | 33.8 | 43.9 | 49.0 | 54.1 | 7 | 6 | 5 | 6.5 | 28.6 | 80 | 92 | 104 | 5 | 8.5 | 0 | | | | | | | | | | | |
| 48 FT | 23 | 25 | 10 | 8 | 7 | 5 | 6 | 33.8 | 43.3 | 48.3 | 53.4 | 7 | 6 | 5 | 6 | 28.6 | 81 | 93 | 105 | 5 | 8 | 0 | | | | | | | | | | | |
| 50 FT | 24 | 25 | 10 | 8 | 7 | 5 | 6 | 33.8 | 44.8 | 49.9 | 55.0 | 7 | 6 | 5 | 6 | 28.6 | 81 | 93 | 105 | 5 | 8 | 0 | | | | | | | | | | | |

| SPAN (S) = 10 FT | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|--------|---------------------------------------|---------|------|------------------|------|------|------|--------|---------|--------|------|------|-----------|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | |
| | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | HT=11' | HT=12' | HT=13' | | | | | |
| 1 FT | 11 | 11 | 9 | 6 | 8 | 6 | 7.5 | 80.0 | 31.3 | 33.8 | 36.4 | 6 | 7.5 | 6 | 6 | 80.0 | 139 | 151 | 163 | 5 | 8.5 | 12 | | |
| 2 FT | 11 | 11 | 9 | 6 | 7.5 | 6 | 7 | 80.0 | 35.8 | 38.6 | 41.5 | 6 | 7.5 | 6 | 6 | 80.0 | 139 | 151 | 163 | 5 | 8.5 | 12 | | |
| 4 FT | 9 | 11 | 9 | 6 | 8 | 6 | 6.5 | 80.0 | 33.8 | 36.6 | 39.4 | 6 | 7.5 | 6 | 6 | 80.0 | 139 | 151 | 163 | 5 | 8 | 0 | | |
| 6 FT | 9 | 12 | 9 | 5 | 6 | 6 | 6 | 80.0 | 31.1 | 33.6 | 36.1 | 6 | 7.5 | 6 | 6 | 80.0 | 140 | 152 | 164 | 5 | 7.5 | 0 | | |
| 8 FT | 9 | 12 | 10 | 5 | 6 | 6 | 6.5 | 75.4 | 31.1 | 33.6 | 36.1 | 6 | 7.5 | 6 | 6.5 | 80.6 | 140 | 152 | 164 | 5 | 7.5 | 0 | | |
| 10 FT | 10 | 12 | 10 | 6 | 8 | 6 | 6.5 | 74.1 | 32.8 | 35.4 | 38.0 | 6 | 7 | 6 | 6 | 80.6 | 140 | 152 | 164 | 5 | 7 | 0 | | |
| 12 FT | 10 | 12 | 10 | 6 | 8.5 | 6 | 6.5 | 58.5 | 32.8 | 35.4 | 38.0 | 6 | 7.5 | 6 | 6 | 71.5 | 140 | 152 | 164 | 5 | 8 | 0 | | |
| 14 FT | 10 | 13 | 10 | 6 | 7.5 | 6 | 6 | 57.3 | 31.5 | 34.0 | 36.5 | 6 | 7 | 6 | 6 | 74.1 | 141 | 153 | 165 | 5 | 7 | 0 | | |
| 16 FT | 11 | 13 | 11 | 6 | 7 | 6 | 6.5 | 56.4 | 33.3 | 35.9 | 38.5 | 6 | 6.5 | 6 | 6.5 | 65.5 | 141 | 153 | 165 | 5 | 7.5 | 0 | | |
| 18 FT | 12 | 14 | 12 | 6 | 7 | 6 | 7.5 | 56.8 | 33.6 | 36.3 | 39.0 | 6 | 6.5 | 6 | 7.5 | 63.4 | 142 | 154 | 166 | 5 | 7 | 0 | | |
| 20 FT | 13 | 15 | 12 | 6 | 6.5 | 6 | 7 | 56.8 | 35.6 | 38.4 | 41.1 | 6 | 6 | 6 | 7 | 64.6 | 143 | 155 | 167 | 5 | 7 | 0 | | |
| 22 FT | 13 | 15 | 13 | 6 | 6 | 6 | 7 | 55.9 | 35.6 | 38.4 | 41.1 | 7 | 8 | 6 | 7 | 61.1 | 143 | 155 | 167 | 5 | 6.5 | 0 | | |
| 24 FT | 14 | 16 | 13 | 6 | 6 | 6 | 6.5 | 57.3 | 36.1 | 38.9 | 41.6 | 7 | 7.5 | 6 | 7 | 61.1 | 144 | 156 | 168 | 5 | 6.5 | 0 | | |
| 26 FT | 15 | 17 | 13 | 7 | 8 | 6 | 6 | 63.9 | 36.6 | 39.4 | 42.1 | 7 | 7.5 | 6 | 6 | 62.5 | 145 | 157 | 169 | 5 | 6.5 | 0 | | |
| 28 FT | 16 | 18 | 14 | 7 | 8 | 6 | 6.5 | 63.0 | 38.6 | 41.5 | 44.4 | 7 | 7.5 | 6 | 6.5 | 61.6 | 146 | 158 | 170 | 5 | 6 | 0 | | |
| 30 FT | 16 | 18 | 14 | 7 | 7 | 6 | 6 | 63.0 | 40.3 | 43.3 | 46.3 | 7 | 7 | 6 | 6 | 61.6 | 146 | 158 | 170 | 5 | 6 | 0 | | |
| 32 FT | 17 | 19 | 15 | 7 | 7 | 6 | 6 | 63.5 | 42.4 | 45.5 | 48.6 | 7 | 7 | 6 | 6 | 60.8 | 147 | 159 | 171 | 6 | 8 | 0 | | |
| 34 FT | 18 | 20 | 15 | 7 | 7 | 6 | 6 | 63.5 | 42.9 | 46.0 | 49.1 | 7 | 7 | 6 | 6 | 62.1 | 148 | 160 | 172 | 6 | 8 | 0 | | |
| 36 FT | 19 | 21 | 16 | 7 | 7 | 6 | 6 | 63.9 | 43.4 | 46.5 | 49.6 | 7 | 7 | 6 | 6 | 62.5 | 149 | 161 | 173 | 6 | 8 | 0 | | |
| 38 FT | 19 | 21 | 16 | 7 | 6.5 | 7 | 7.5 | 69.4 | 43.4 | 46.5 | 49.6 | 7 | 6.5 | 6 | 6 | 61.3 | 149 | 161 | 173 | 6 | 8 | 0 | | |
| 40 FT | 20 | 22 | 17 | 7 | 6.5 | 6 | 6 | 64.4 | 45.6 | 48.9 | 52.1 | 7 | 6.5 | 6 | 6 | 61.6 | 150 | 162 | 174 | 6 | 7.5 | 0 | | |
| 42 FT | 21 | 23 | 17 | 7 | 6.5 | 7 | 7.5 | 69.9 | 46.1 | 49.4 | 52.6 | 7 | 6.5 | 6 | 6 | 63.0 | 151 | 163 | 175 | 6 | 7.5 | 0 | | |
| 44 FT | 21 | 23 | 18 | 7 | 6.5 | 6 | 6 | 64.9 | 46.1 | 49.4 | 52.6 | 7 | 6.5 | 6 | 6 | 62.1 | 151 | 163 | 175 | 6 | 7 | 0 | | |
| 46 FT | 22 | 24 | 19 | 7 | 6.5 | 6 | 6 | 65.4 | 46.8 | 50.0 | 53.3 | 7 | 6.5 | 6 | 6 | 62.5 | 152 | 164 | 176 | 6 | 6.5 | 0 | | |
| 48 FT | 23 | 25 | 19 | 7 | 6 | 6 | 6 | 65.4 | 47.3 | 50.5 | 53.8 | 7 | 6 | 6 | 6 | 62.5 | 153 | 165 | 177 | 6 | 6.5 | 0 | | |
| 50 FT | 23 | 25 | 20 | 7 | 6 | 6 | 6 | 65.8 | 47.3 | 50.5 | 53.8 | 7 | 6 | 6 | 6 | 63.0 | 153 | 165 | 177 | 6 | 6.5 | 0 | | |

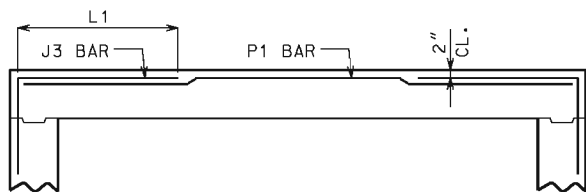


| SPAN (S) = 11 FT | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT | | | | | | | | | | | |
|------------------|------------------|------|------|---------------|-----|---------|-------|-------|------|---------|-------|------------------------------------|------|------|-----|---------|------|------|-----|-----------|-----|----|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | | | |
| | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | | | SPA. | SIZE | SPA. | C4 | | | | K3 | | | | |
| | | | | | | HT=6' | HT=7' | HT=8' | | HT=6' | HT=7' | | | | | HT=8' | SIZE | SPA. | G1 | | | | |
| 1 FT | 12 | 10 | 8 | 6 | 7.5 | 5 | 7 | 82.6 | 32.0 | 36.4 | 40.6 | 6 | 8 | 6 | 7.5 | 61.6 | 78 | 90 | 102 | 5 | 12 | 12 | |
| 2 FT | 12 | 10 | 8 | 6 | 7.5 | 5 | 6.5 | 82.6 | 32.0 | 36.4 | 40.6 | 6 | 7.5 | 6 | 7 | 53.3 | 78 | 90 | 102 | 5 | 12 | 12 | |
| 4 FT | 9 | 10 | 8 | 6 | 7 | 6 | 6.5 | 46.3 | 29.3 | 33.4 | 37.4 | 6 | 7 | 6 | 7.5 | 46.3 | 78 | 90 | 102 | 5 | 12 | 0 | |
| 6 FT | 9 | 10 | 8 | 6 | 7 | 6 | 6.5 | 43.4 | 29.3 | 33.4 | 37.4 | 6 | 6.5 | 6 | 6.5 | 42.0 | 78 | 90 | 102 | 5 | 12 | 0 | |
| 8 FT | 9 | 10 | 8 | 6 | 6.5 | 6 | 6 | 42.0 | 33.5 | 38.3 | 42.9 | 6 | 6 | 6 | 6 | 40.6 | 78 | 90 | 102 | 5 | 12 | 0 | |
| 10 FT | 10 | 11 | 8 | 6 | 6.5 | 6 | 6.5 | 39.3 | 30.8 | 35.0 | 39.3 | 7 | 8 | 6 | 7 | 37.8 | 79 | 91 | 103 | 5 | 12 | 0 | |
| 12 FT | 10 | 11 | 8 | 6 | 6.5 | 6 | 6.5 | 37.8 | 30.8 | 35.0 | 39.3 | 6 | 6 | 6 | 7 | 35.0 | 79 | 91 | 103 | 5 | 12 | 0 | |
| 14 FT | 10 | 11 | 8 | 7 | 7.5 | 6 | 6 | 36.4 | 34.4 | 39.0 | 43.6 | 7 | 7 | 6 | 6 | 35.0 | 79 | 91 | 103 | 5 | 12 | 0 | |
| 16 FT | 11 | 13 | 8 | 7 | 7 | 6 | 6 | 36.4 | 31.9 | 36.0 | 40.3 | 7 | 7 | 5 | 6.5 | 30.8 | 81 | 93 | 105 | 5 | 12 | 0 | |
| 18 FT | 11 | 14 | 8 | 7 | 6 | 7 | 6 | 39.3 | 31.3 | 35.4 | 39.5 | 7 | 6.5 | 5 | 7 | 29.4 | 82 | 94 | 106 | 5 | 12 | 0 | |
| 20 FT | 13 | 15 | 8 | 7 | 6.5 | 6 | 6.5 | 33.6 | 33.3 | 37.5 | 41.6 | 7 | 6.5 | 5 | 7 | 29.4 | 83 | 95 | 107 | 5 | 12 | 0 | |
| 22 FT | 14 | 16 | 8 | 7 | 6 | 6 | 6.5 | 33.6 | 34.9 | 39.3 | 43.5 | 7 | 6.5 | 5 | 7 | 29.4 | 84 | 96 | 108 | 5 | 12 | 0 | |
| 24 FT | 15 | 17 | 8 | 7 | 6 | 6 | 6.5 | 39.3 | 35.6 | 40.0 | 44.3 | 7 | 6.5 | 5 | 6.5 | 29.4 | 85 | 97 | 109 | 5 | 12 | 0 | |
| 26 FT | 16 | 18 | 8 | 7 | 6 | 6 | 6.5 | 37.8 | 36.4 | 40.6 | 45.0 | 7 | 6.5 | 5 | 6.5 | 29.4 | 86 | 98 | 110 | 5 | 10 | 0 | |
| 28 FT | 17 | 19 | 8 | 8 | 7.5 | 6 | 6.5 | 37.8 | 37.1 | 41.4 | 45.8 | 7 | 6 | 5 | 6.5 | 29.4 | 87 | 99 | 111 | 5 | 9.5 | 0 | |
| 30 FT | 18 | 20 | 8 | 8 | 7.5 | 6 | 6 | 37.8 | 38.9 | 43.3 | 47.8 | 7 | 6 | 5 | 6 | 29.4 | 88 | 100 | 112 | 5 | 9.5 | 0 | |
| 32 FT | 19 | 21 | 9 | 8 | 7.5 | 6 | 7 | 39.5 | 39.6 | 44.0 | 48.5 | 7 | 6 | 5 | 6.5 | 29.6 | 89 | 101 | 113 | 5 | 9 | 0 | |
| 34 FT | 20 | 22 | 10 | 8 | 7.5 | 6 | 8 | 39.8 | 40.4 | 44.8 | 49.3 | 7 | 6 | 5 | 7 | 31.3 | 90 | 102 | 114 | 5 | 10 | 0 | |
| 36 FT | 21 | 23 | 10 | 8 | 7.5 | 6 | 8 | 39.8 | 41.1 | 45.5 | 50.0 | 7 | 6 | 5 | 6.5 | 31.3 | 91 | 103 | 115 | 5 | 9 | 0 | |
| 38 FT | 22 | 23 | 10 | 8 | 7 | 6 | 8 | 39.8 | 42.5 | 47.1 | 51.6 | 8 | 7.5 | 5 | 6.5 | 31.3 | 91 | 103 | 115 | 5 | 8 | 0 | |
| 40 FT | 22 | 24 | 11 | 8 | 7 | 6 | 7 | 40.0 | 43.0 | 47.5 | 52.0 | 8 | 7.5 | 5 | 7 | 31.5 | 92 | 104 | 116 | 5 | 9 | 0 | |
| 42 FT | 23 | 25 | 11 | 8 | 7 | 6 | 8 | 40.0 | 43.8 | 48.3 | 52.9 | 8 | 7.5 | 5 | 7 | 31.5 | 93 | 105 | 117 | 5 | 8.5 | 0 | |
| 44 FT | 24 | 26 | 11 | 8 | 7 | 6 | 8 | 40.0 | 44.5 | 49.0 | 53.6 | 8 | 7.5 | 5 | 6.5 | 31.5 | 94 | 106 | 118 | 5 | 7.5 | 0 | |
| 46 FT | 25 | 26 | 11 | 8 | 6.5 | 6 | 8 | 40.0 | 46.0 | 50.8 | 55.4 | 8 | 7 | 5 | 6.5 | 31.5 | 94 | 106 | 118 | 5 | 7.5 | 0 | |
| 48 FT | 25 | 27 | 11 | 8 | 6.5 | 6 | 7.5 | 40.0 | 45.3 | 49.8 | 54.4 | 8 | 7 | 5 | 6 | 31.5 | 95 | 107 | 119 | 5 | 7.5 | 0 | |
| 50 FT | 26 | 27 | 11 | 8 | 6.5 | 6 | 8 | 40.0 | 46.8 | 51.5 | 56.1 | 8 | 7 | 5 | 6 | 31.5 | 95 | 107 | 119 | 5 | 7.5 | 0 | |

| SPAN (S) = 11 FT | | | | | | | | | | | | HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|--------|---------|--------|---------------------------------------|------|------|------|---------|--------|--------|--------|-----------|------|----|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | |
| | | | | | | | | | HT=12' | HT=13' | HT=14' | | | | | | HT=12' | HT=13' | HT=14' | | | | |
| 1 FT | 12 | 12 | 9 | 6 | 7.5 | 6 | 7 | 86.0 | 32.6 | 35.0 | 37.4 | 6 | 7.5 | 6 | 6 | 86.0 | 152 | 164 | 176 | 5 | 8.5 | 12 | |
| 2 FT | 12 | 12 | 9 | 6 | 7 | 6 | 6.5 | 86.0 | 34.3 | 36.8 | 39.3 | 6 | 7 | 6 | 6 | 86.0 | 152 | 164 | 176 | 5 | 8 | 12 | |
| 4 FT | 9 | 11 | 10 | 6 | 7 | 6 | 6 | 86.6 | 33.4 | 35.9 | 38.4 | 6 | 6.5 | 6 | 6 | 86.6 | 151 | 163 | 175 | 5 | 7.5 | 0 | |
| 6 FT | 9 | 12 | 10 | 6 | 7.5 | 6 | 6 | 86.6 | 33.6 | 36.1 | 38.6 | 6 | 6.5 | 6 | 6 | 88.0 | 152 | 164 | 176 | 5 | 7 | 0 | |
| 8 FT | 10 | 13 | 10 | 6 | 7.5 | 6 | 6 | 86.6 | 34.0 | 36.5 | 39.0 | 6 | 7 | 6 | 6 | 86.6 | 153 | 165 | 177 | 5 | 6.5 | 0 | |
| 10 FT | 10 | 13 | 11 | 6 | 7 | 6 | 6 | 70.1 | 34.0 | 36.5 | 39.0 | 6 | 6.5 | 6 | 6.5 | 88.6 | 153 | 165 | 177 | 5 | 6.5 | 0 | |
| 12 FT | 10 | 13 | 11 | 6 | 7.5 | 6 | 6 | 60.0 | 32.4 | 34.8 | 37.3 | 6 | 6.5 | 6 | 6.5 | 74.4 | 153 | 165 | 177 | 5 | 7.5 | 0 | |
| 14 FT | 11 | 13 | 11 | 6 | 6.5 | 6 | 6 | 60.0 | 35.9 | 38.5 | 41.1 | 6 | 6 | 6 | 6 | 70.1 | 153 | 165 | 177 | 5 | 7 | 0 | |
| 16 FT | 12 | 14 | 12 | 6 | 6.5 | 6 | 7 | 60.5 | 36.3 | 39.0 | 41.6 | 7 | 8 | 6 | 6.5 | 67.6 | 154 | 166 | 178 | 5 | 7 | 0 | |
| 18 FT | 13 | 15 | 13 | 6 | 6 | 6 | 7 | 59.5 | 38.4 | 41.1 | 43.9 | 7 | 7.5 | 6 | 7 | 65.3 | 155 | 167 | 179 | 5 | 6.5 | 0 | |
| 20 FT | 14 | 16 | 13 | 6 | 6 | 6 | 6.5 | 60.9 | 38.9 | 41.6 | 44.4 | 7 | 7.5 | 6 | 6.5 | 66.8 | 156 | 168 | 180 | 5 | 6.5 | 0 | |
| 22 FT | 14 | 17 | 14 | 7 | 7.5 | 6 | 6.5 | 59.9 | 39.1 | 41.9 | 44.6 | 7 | 7 | 6 | 6.5 | 64.3 | 157 | 169 | 181 | 5 | 6 | 0 | |
| 24 FT | 15 | 17 | 14 | 7 | 7 | 6 | 6 | 65.8 | 39.4 | 42.1 | 44.9 | 7 | 6.5 | 6 | 6 | 64.3 | 157 | 169 | 181 | 5 | 6 | 0 | |
| 26 FT | 16 | 18 | 15 | 7 | 7 | 6 | 6 | 66.1 | 41.5 | 44.4 | 47.3 | 7 | 6.5 | 6 | 6 | 63.3 | 158 | 170 | 182 | 6 | 8 | 0 | |
| 28 FT | 17 | 19 | 15 | 7 | 7 | 6 | 6 | 66.1 | 42.0 | 44.9 | 47.8 | 7 | 6.5 | 6 | 6 | 64.6 | 159 | 171 | 183 | 6 | 8 | 0 | |
| 30 FT | 18 | 20 | 16 | 7 | 7 | 6 | 6 | 66.6 | 42.5 | 45.4 | 48.3 | 7 | 6.5 | 6 | 6 | 63.6 | 160 | 172 | 184 | 6 | 8 | 0 | |
| 32 FT | 19 | 21 | 16 | 7 | 6.5 | 7 | 8 | 72.5 | 44.8 | 47.8 | 50.8 | 7 | 6.5 | 7 | 8 | 68.1 | 161 | 173 | 185 | 6 | 8 | 0 | |
| 34 FT | 20 | 22 | 16 | 7 | 6.5 | 7 | 7 | 72.5 | 45.3 | 48.3 | 51.3 | 7 | 6.5 | 7 | 7 | 68.1 | 162 | 174 | 186 | 6 | 8 | 0 | |
| 36 FT | 20 | 22 | 17 | 7 | 6 | 7 | 7.5 | 71.5 | 50.6 | 54.0 | 57.4 | 7 | 6 | 7 | 7 | 67.0 | 162 | 174 | 186 | 6 | 7.5 | 0 | |
| 38 FT | 21 | 23 | 18 | 7 | 6 | 7 | 7.5 | 72.0 | 45.8 | 48.8 | 51.8 | 7 | 6 | 7 | 7.5 | 67.5 | 163 | 175 | 187 | 6 | 7 | 0 | |
| 40 FT | 22 | 24 | 18 | 7 | 6 | 7 | 7 | 73.5 | 46.3 | 49.3 | 52.3 | 7 | 6 | 7 | 7.5 | 69.0 | 164 | 176 | 188 | 6 | 7 | 0 | |
| 42 FT | 23 | 25 | 19 | 7 | 6 | 7 | 7.5 | 74.0 | 48.6 | 51.8 | 54.9 | 7 | 6 | 7 | 8 | 68.0 | 165 | 177 | 189 | 6 | 6.5 | 0 | |
| 44 FT | 23 | 26 | 20 | 7 | 6 | 7 | 7.5 | 73.0 | 47.0 | 50.0 | 53.0 | 7 | 6 | 6 | 6 | 65.4 | 166 | 178 | 190 | 6 | 6.5 | 0 | |
| 46 FT | 24 | 26 | 20 | 8 | 7.5 | 7 | 7 | 73.0 | 49.1 | 52.3 | 55.4 | 8 | 7.5 | 7 | 7.5 | 68.4 | 166 | 178 | 190 | 6 | 6.5 | 0 | |
| 48 FT | 25 | 27 | 21 | 8 | 7.5 | 7 | 7.5 | 73.5 | 49.6 | 52.8 | 55.9 | 8 | 7.5 | 7 | 8 | 68.9 | 167 | 179 | 191 | 6 | 6 | 0 | |
| 50 FT | 25 | 27 | 21 | 8 | 7 | 7 | 7 | 73.5 | 49.6 | 52.8 | 55.9 | 8 | 7 | 7 | 7 | 68.9 | 167 | 179 | 191 | 6 | 6 | 0 | |



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT ϵ CULVERT.



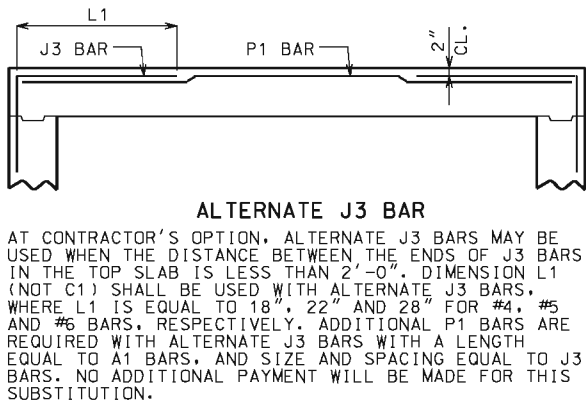
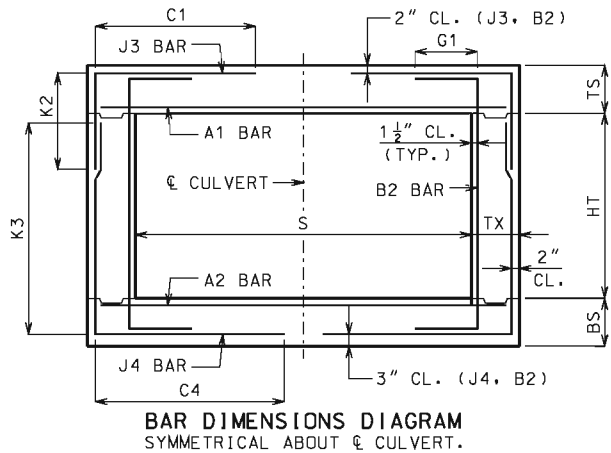
ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

| SPAN (S) = 11 FT | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|-------|---------|--------|--------------------------------------|------|------|------|---------|-------|--------|--------|-----------|------|----|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | |
| | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | HT=9' | HT=10' | HT=11' | | | | |
| 1 FT | 12 | 11 | 8 | 6 | 7.5 | 5 | 7 | 82.6 | 32.8 | 35.9 | 39.0 | 6 | 7.5 | 6 | 6.5 | 85.4 | 115 | 127 | 139 | 5 | 9.5 | 12 | |
| 2 FT | 12 | 11 | 8 | 6 | 7 | 5 | 6.5 | 82.6 | 32.8 | 35.9 | 39.0 | 6 | 7 | 6 | 6 | 85.4 | 115 | 127 | 139 | 5 | 9.5 | 12 | |
| 4 FT | 9 | 10 | 9 | 6 | 7 | 6 | 6.5 | 70.5 | 34.1 | 37.5 | 40.9 | 6 | 6.5 | 6 | 6 | 73.4 | 114 | 126 | 138 | 5 | 9.5 | 0 | |
| 6 FT | 9 | 11 | 9 | 6 | 7.5 | 6 | 6 | 57.8 | 30.8 | 33.8 | 36.8 | 6 | 6.5 | 6 | 6 | 64.9 | 115 | 127 | 139 | 5 | 9.5 | 0 | |
| 8 FT | 9 | 11 | 9 | 6 | 7 | 7 | 6.5 | 56.4 | 30.8 | 33.8 | 36.8 | 6 | 6 | 6 | 6 | 56.4 | 115 | 127 | 139 | 5 | 9 | 0 | |
| 10 FT | 10 | 12 | 9 | 6 | 6.5 | 6 | 6 | 50.8 | 31.3 | 34.3 | 37.3 | 6 | 6 | 6 | 6 | 55.0 | 116 | 128 | 140 | 5 | 8.5 | 0 | |
| 12 FT | 10 | 12 | 9 | 6 | 6.5 | 6 | 6 | 46.5 | 31.3 | 34.3 | 37.3 | 6 | 6 | 6 | 6 | 48.0 | 116 | 128 | 140 | 5 | 10 | 0 | |
| 14 FT | 11 | 12 | 9 | 6 | 6 | 6 | 6.5 | 45.1 | 35.3 | 38.6 | 42.0 | 7 | 7.5 | 6 | 6 | 46.5 | 116 | 128 | 140 | 5 | 9 | 0 | |
| 16 FT | 11 | 13 | 10 | 7 | 7.5 | 6 | 6 | 45.5 | 33.0 | 36.1 | 39.3 | 7 | 7 | 6 | 6.5 | 46.9 | 117 | 129 | 141 | 5 | 9.5 | 0 | |
| 18 FT | 12 | 14 | 10 | 7 | 7 | 6 | 6.5 | 45.5 | 32.3 | 35.3 | 38.3 | 7 | 7 | 6 | 6.5 | 45.5 | 118 | 130 | 142 | 5 | 8.5 | 0 | |
| 20 FT | 13 | 15 | 10 | 7 | 7 | 6 | 6 | 45.5 | 34.0 | 37.1 | 40.3 | 7 | 6.5 | 6 | 6.5 | 45.5 | 119 | 131 | 143 | 5 | 8 | 0 | |
| 22 FT | 14 | 16 | 11 | 7 | 7 | 6 | 6.5 | 45.8 | 35.9 | 39.1 | 42.4 | 7 | 6.5 | 6 | 7.5 | 45.8 | 120 | 132 | 144 | 5 | 8 | 0 | |
| 24 FT | 15 | 17 | 11 | 7 | 6.5 | 6 | 6 | 51.5 | 36.5 | 39.8 | 42.9 | 7 | 6.5 | 6 | 7.5 | 45.8 | 121 | 133 | 145 | 5 | 7.5 | 0 | |
| 26 FT | 16 | 18 | 12 | 7 | 6.5 | 6 | 6.5 | 51.9 | 37.0 | 40.3 | 43.5 | 7 | 6.5 | 6 | 8 | 46.1 | 122 | 134 | 146 | 5 | 7.5 | 0 | |
| 28 FT | 17 | 19 | 12 | 7 | 6.5 | 6 | 6.5 | 51.9 | 37.5 | 40.8 | 44.0 | 7 | 6.5 | 6 | 7.5 | 46.1 | 123 | 135 | 147 | 5 | 7 | 0 | |
| 30 FT | 18 | 20 | 13 | 7 | 6.5 | 6 | 6.5 | 52.3 | 38.1 | 41.3 | 44.5 | 7 | 6.5 | 6 | 8 | 46.4 | 124 | 136 | 148 | 5 | 7.5 | 0 | |
| 32 FT | 19 | 21 | 13 | 7 | 6 | 6 | 6.5 | 52.3 | 40.0 | 43.4 | 46.8 | 7 | 6 | 6 | 7.5 | 46.4 | 125 | 137 | 149 | 5 | 6.5 | 0 | |
| 34 FT | 20 | 22 | 13 | 7 | 6 | 6 | 6 | 52.3 | 40.6 | 44.0 | 47.4 | 7 | 6 | 6 | 7.5 | 46.4 | 126 | 138 | 150 | 5 | 6.5 | 0 | |
| 36 FT | 21 | 22 | 13 | 7 | 6 | 6 | 6 | 52.3 | 45.3 | 49.0 | 52.8 | 7 | 6 | 6 | 6.5 | 46.4 | 126 | 138 | 150 | 5 | 6.5 | 0 | |
| 38 FT | 21 | 23 | 14 | 8 | 7.5 | 6 | 6 | 52.5 | 41.1 | 44.5 | 47.9 | 7 | 6 | 6 | 7.5 | 46.8 | 127 | 139 | 151 | 5 | 6 | 0 | |
| 40 FT | 22 | 24 | 14 | 8 | 7.5 | 6 | 6 | 52.5 | 43.3 | 46.8 | 50.1 | 8 | 7.5 | 6 | 7 | 48.1 | 128 | 140 | 152 | 5 | 6 | 0 | |
| 42 FT | 23 | 25 | 15 | 8 | 7.5 | 6 | 6.5 | 52.9 | 48.4 | 52.1 | 56.0 | 8 | 7.5 | 6 | 7.5 | 48.5 | 129 | 141 | 153 | 5 | 6 | 0 | |
| 44 FT | 24 | 25 | 15 | 8 | 7 | 6 | 6.5 | 52.9 | 48.6 | 52.5 | 56.4 | 8 | 7 | 6 | 6.5 | 48.5 | 129 | 141 | 153 | 6 | 8 | 0 | |
| 46 FT | 24 | 26 | 15 | 8 | 7 | 6 | 6 | 52.9 | 49.0 | 52.8 | 56.6 | 8 | 7 | 6 | 7 | 48.5 | 130 | 142 | 154 | 6 | 8 | 0 | |
| 48 FT | 25 | 27 | 16 | 8 | 7 | 6 | 6 | 53.3 | 49.6 | 53.5 | 57.3 | 8 | 7 | 6 | 7.5 | 48.9 | 131 | 143 | 155 | 6 | 8 | 0 | |
| 50 FT | 26 | 27 | 16 | 8 | 6.5 | 6 | 6 | 53.3 | 51.5 | 55.5 | 59.4 | 8 | 7 | 6 | 6.5 | 48.9 | 131 | 143 | 155 | 6 | 8 | 0 | |

| SPAN (S) = 12 FT | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|-------|-------|---------|------------------------------------|------------------|------|------|------|-------|-------|-------|------|------|-----------|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | |
| | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | HT=6' | HT=7' | HT=8' | | | | | |
| 1 FT | 13 | 10 | 8 | 6 | 7.5 | 5 | 8.5 | 89.6 | 33.3 | 37.8 | 42.1 | 6 | 7.5 | 6 | 6.5 | 57.8 | 78 | 90 | 102 | 5 | 12 | 12 | | |
| 2 FT | 14 | 10 | 8 | 6 | 7 | 5 | 8.5 | 89.6 | 34.6 | 39.1 | 43.8 | 6 | 7 | 6 | 6 | 51.6 | 78 | 90 | 102 | 5 | 12 | 12 | | |
| 4 FT | 10 | 11 | 8 | 6 | 6.5 | 6 | 6.5 | 47.1 | 30.8 | 35.0 | 39.3 | 6 | 6.5 | 5 | 6.5 | 42.5 | 79 | 91 | 103 | 5 | 12 | 0 | | |
| 6 FT | 10 | 11 | 8 | 6 | 6.5 | 6 | 6.5 | 44.1 | 30.8 | 35.0 | 39.3 | 6 | 6 | 5 | 6 | 39.5 | 79 | 91 | 103 | 5 | 12 | 0 | | |
| 8 FT | 10 | 11 | 8 | 6 | 6 | 6 | 6.5 | 41.0 | 30.8 | 35.0 | 39.3 | 7 | 7.5 | 6 | 6.5 | 39.5 | 79 | 91 | 103 | 5 | 12 | 0 | | |
| 10 FT | 10 | 11 | 8 | 7 | 7 | 7 | 6 | 42.5 | 34.4 | 39.0 | 43.6 | 7 | 6.5 | 6 | 6 | 38.0 | 79 | 91 | 103 | 5 | 12 | 0 | | |
| 12 FT | 11 | 12 | 8 | 7 | 7 | 6 | 6 | 38.0 | 35.1 | 39.8 | 44.5 | 7 | 6.5 | 6 | 6.5 | 36.5 | 80 | 92 | 104 | 5 | 12 | 0 | | |
| 14 FT | 11 | 13 | 8 | 7 | 7 | 6 | 6 | 36.5 | 31.9 | 36.0 | 40.3 | 7 | 6.5 | 5 | 7 | 30.4 | 81 | 93 | 105 | 5 | 12 | 0 | | |
| 16 FT | 12 | 14 | 8 | 7 | 6.5 | 6 | 6 | 35.0 | 32.5 | 36.8 | 41.0 | 7 | 6.5 | 5 | 7 | 30.4 | 82 | 94 | 106 | 5 | 12 | 0 | | |
| 18 FT | 13 | 15 | 8 | 7 | 6 | 6 | 6.5 | 33.5 | 33.3 | 37.5 | 41.6 | 7 | 6 | 5 | 6.5 | 30.4 | 83 | 95 | 107 | 5 | 12 | 0 | | |
| 20 FT | 15 | 17 | 8 | 7 | 6 | 6 | 7 | 39.5 | 35.6 | 40.0 | 44.3 | 7 | 6.5 | 5 | 7 | 30.4 | 85 | 97 | 109 | 5 | 12 | 0 | | |
| 22 FT | 16 | 18 | 8 | 7 | 6 | 6 | 7 | 39.5 | 36.4 | 40.6 | 45.0 | 7 | 6 | 5 | 6.5 | 30.4 | 86 | 98 | 110 | 5 | 12 | 0 | | |
| 24 FT | 17 | 19 | 8 | 8 | 7.5 | 6 | 7 | 39.5 | 37.1 | 41.4 | 45.8 | 7 | 6 | 5 | 6.5 | 30.4 | 87 | 99 | 111 | 5 | 11 | 0 | | |
| 26 FT | 18 | 20 | 8 | 8 | 7 | 6 | 7 | 39.5 | 38.9 | 43.3 | 47.8 | 7 | 6 | 5 | 6 | 30.4 | 88 | 100 | 112 | 5 | 9.5 | 0 | | |
| 28 FT | 19 | 21 | 8 | 8 | 7 | 6 | 7 | 39.5 | 39.6 | 44.0 | 48.5 | 7 | 6 | 6 | 7.5 | 33.5 | 89 | 101 | 113 | 5 | 9.5 | 0 | | |
| 30 FT | 20 | 21 | 8 | 8 | 7 | 6 | 6.5 | 39.5 | 44.3 | 49.3 | 54.1 | 8 | 7 | 6 | 7.5 | 33.5 | 89 | 101 | 113 | 5 | 9.5 | 0 | | |
| 32 FT | 21 | 23 | 9 | 8 | 7 | 6 | 7.5 | 39.8 | 41.1 | 45.5 | 50.0 | 8 | 7.5 | 5 | 6 | 30.6 | 91 | 103 | 115 | 5 | 8.5 | 0 | | |
| 34 FT | 22 | 23 | 9 | 8 | 6.5 | 6 | 7.5 | 39.8 | 42.5 | 47.1 | 51.6 | 8 | 7 | 5 | 6 | 30.6 | 91 | 103 | 115 | 5 | 8.5 | 0 | | |
| 36 FT | 23 | 24 | 9 | 8 | 6.5 | 6 | 7 | 39.8 | 47.9 | 52.9 | 58.0 | 8 | 7 | 6 | 7 | 33.6 | 92 | 104 | 116 | 5 | 8.5 | 0 | | |
| 38 FT | 24 | 25 | 9 | 8 | 6.5 | 6 | 6.5 | 39.8 | 48.8 | 53.8 | 58.8 | 8 | 7 | 6 | 7 | 33.6 | 93 | 105 | 117 | 5 | 8.5 | 0 | | |
| 40 FT | 24 | 26 | 10 | 8 | 6 | 6 | 7 | 40.0 | 44.5 | 49.0 | 53.6 | 8 | 7 | 5 | 6 | 30.8 | 94 | 106 | 118 | 5 | 8 | 0 | | |
| 42 FT | 25 | 27 | 10 | 8 | 6 | 6 | 7 | 40.0 | 45.3 | 49.8 | 54.4 | 8 | 7 | 6 | 7 | 33.9 | 95 | 107 | 119 | 5 | 8 | 0 | | |
| 44 FT | 26 | 27 | 10 | 8 | 6 | 6 | 7 | 40.0 | 50.4 | 55.5 | 60.5 | 8 | 6.5 | 6 | 7 | 33.9 | 95 | 107 | 119 | 5 | 8 | 0 | | |
| 46 FT | 27 | 28 | 10 | 8 | 6 | 6 | 7 | 40.0 | 51.3 | 56.3 | 61.4 | 8 | 6.5 | 6 | 7 | 33.9 | 96 | 108 | 120 | 5 | 7.5 | 0 | | |
| 48 FT | 28 | 29 | 11 | 8 | 6 | 6 | 7.5 | 40.3 | 52.1 | 57.1 | 62.1 | 8 | 6.5 | 6 | 7.5 | 34.1 | 97 | 109 | 121 | 5 | 7.5 | 0 | | |
| 50 FT | 28 | 30 | 11 | 8 | 6 | 6 | 7.5 | 40.3 | 52.5 | 57.5 | 62.6 | 8 | 6.5 | 6 | 7 | 34.1 | 98 | 110 | 122 | 5 | 7.5 | 0 | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | HEIGHT (HT) = 12 FT OR 13 FT | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|--------|--------|------------------|------------------------------|---------|------|------|--------|--------|-----------|------|----|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | BOTTOM SLAB BARS | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | |
| | | | | | | | | | HT=12' | HT=13' | | | | | | HT=12' | HT=13' | | | | | | |
| 1 FT | 12 | 11 | 9 | 6 | 6.5 | 5 | 6 | 90.3 | 32.4 | 34.8 | 6 | 6.5 | 6 | 6 | 91.8 | 151 | 163 | 5 | 8.5 | 12 | | | |
| 2 FT | 12 | 11 | 9 | 6 | 6.5 | 6 | 7 | 91.8 | 34.0 | 36.5 | 6 | 6.5 | 6 | 6 | 91.8 | 151 | 163 | 5 | 8.5 | 12 | | | |
| 4 FT | 10 | 12 | 9 | 6 | 6.5 | 6 | 6 | 91.8 | 35.4 | 38.0 | 6 | 6.5 | 6 | 6 | 91.8 | 152 | 164 | 5 | 8.5 | 0 | | | |
| 6 FT | 10 | 12 | 9 | 6 | 6.5 | 7 | 6.5 | 81.1 | 35.4 | 38.0 | 6 | 6 | 6 | 6 | 91.8 | 152 | 164 | 5 | 8 | 0 | | | |
| 8 FT | 10 | 12 | 10 | 6 | 6.5 | 6 | 6 | 64.6 | 35.4 | 38.0 | 7 | 7.5 | 6 | 6 | 73.9 | 152 | 164 | 5 | 8 | 0 | | | |
| 10 FT | 11 | 13 | 10 | 6 | 6 | 6 | 6 | 61.6 | 35.9 | 38.5 | 7 | 7.5 | 6 | 6 | 69.3 | 153 | 165 | 5 | 8 | 0 | | | |
| 12 FT | 12 | 13 | 11 | 6 | 6 | 6 | 7 | 58.9 | 36.1 | 38.8 | 7 | 7 | 6 | 6 | 62.0 | 153 | 165 | 5 | 7.5 | 0 | | | |
| 14 FT | 12 | 13 | 11 | 6 | 6 | 6 | 7 | 54.3 | 36.1 | 38.8 | 7 | 7 | 6 | 6 | 55.8 | 153 | 165 | 5 | 7.5 | 0 | | | |
| 16 FT | 12 | 14 | 11 | 7 | 7 | 6 | 6 | 52.8 | 36.3 | 39.0 | 7 | 6.5 | 6 | 6.5 | 55.8 | 154 | 166 | 5 | 7.5 | 0 | | | |
| 18 FT | 13 | 16 | 12 | 7 | 7 | 6 | 6 | 53.0 | 38.6 | 41.4 | 7 | 6.5 | 6 | 7 | 56.1 | 156 | 168 | 5 | 7 | 0 | | | |
| 20 FT | 14 | 16 | 12 | 7 | 6.5 | 6 | 6 | 53.0 | 38.9 | 41.6 | 7 | 6 | 6 | 6 | 54.6 | 156 | 168 | 5 | 7 | 0 | | | |
| 22 FT | 16 | 18 | 13 | 7 | 6.5 | 6 | 6 | 59.6 | 41.5 | 44.4 | 7 | 6.5 | 6 | 7 | 55.0 | 158 | 170 | 5 | 6.5 | 0 | | | |
| 24 FT | 16 | 19 | 13 | 7 | 6 | 7 | 7 | 64.4 | 40.0 | 42.8 | 7 | 6 | 6 | 6.5 | 55.0 | 159 | 171 | 5 | 6.5 | 0 | | | |
| 26 FT | 18 | 20 | 14 | 7 | 6.5 | 6 | 6 | 58.5 | 42.5 | 45.4 | 7 | 6 | 6 | 6.5 | 55.3 | 160 | 172 | 5 | 6 | 0 | | | |
| 28 FT | 18 | 21 | 14 | 7 | 6 | 7 | 7 | 63.3 | 42.8 | 45.6 | 7 | 6 | 6 | 6.5 | 55.3 | 161 | 173 | 5 | 6 | 0 | | | |
| 30 FT | 19 | 22 | 14 | 8 | 7.5 | 7 | 6.5 | 63.3 | 43.3 | 46.1 | 7 | 6 | 6 | 6 | 55.3 | 162 | 174 | 5 | 6 | 0 | | | |
| 32 FT | 20 | 23 | 15 | 8 | 7.5 | 7 | 7.5 | 63.6 | 45.5 | 48.5 | 8 | 7.5 | 6 | 6.5 | 55.6 | 163 | 175 | 6 | 8 | 0 | | | |
| 34 FT | 21 | 23 | 15 | 8 | 7 | 7 | 7 | 63.6 | 45.8 | 48.8 | 8 | 7 | 6 | 6 | 55.6 | 163 | 175 | 6 | 8 | 0 | | | |
| 36 FT | 22 | 24 | 16 | 8 | 7 | 7 | 7.5 | 64.0 | 46.3 | 49.3 | 8 | 7 | 6 | 6.5 | 56.0 | 164 | 176 | 6 | 8 | 0 | | | |
| 38 FT | 23 | 25 | 16 | 8 | 7 | 7 | 7 | 64.0 | 48.6 | 51.8 | 8 | 7 | 6 | 6 | 56.0 | 165 | 177 | 6 | 8 | 0 | | | |
| 40 FT | 24 | 26 | 17 | 8 | 7 | 7 | 7.5 | 64.4 | 49.1 | 52.3 | 8 | 7 | 6 | 6.5 | 56.4 | 166 | 178 | 6 | 7.5 | 0 | | | |
| 42 FT | 24 | 27 | 17 | 8 | 6.5 | 7 | 6.5 | 64.4 | 49.4 | 52.5 | 8 | 7 | 6 | 6 | 56.4 | 167 | 179 | 6 | 7.5 | 0 | | | |
| 44 FT | 25 | 28 | 18 | 8 | 6.5 | 7 | 7 | 66.4 | 49.9 | 53.0 | 8 | 7 | 6 | 6.5 | 56.8 | 168 | 180 | 6 | 7 | 0 | | | |
| 46 FT | 26 | 28 | 18 | 8 | 6.5 | 7 | 7 | 66.4 | 50.1 | 53.3 | 8 | 6.5 | 6 | 6 | 56.8 | 168 | 180 | 6 | 7 | 0 | | | |
| 48 FT | 27 | 29 | 19 | 8 | 6.5 | 7 | 7.5 | 66.9 | 52.6 | 55.9 | 8 | 6.5 | 6 | 6.5 | 57.0 | 169 | 181 | 6 | 6.5 | 0 | | | |
| 50 FT | 28 | 30 | 19 | 8 | 6.5 | 7 | 7 | 66.9 | 53.3 | 56.4 | 8 | 6.5 | 6 | 6 | 57.0 | 170 | 182 | 6 | 6.5 | 0 | | | |



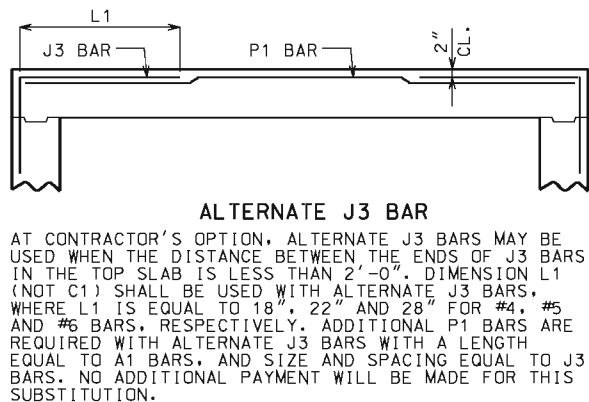
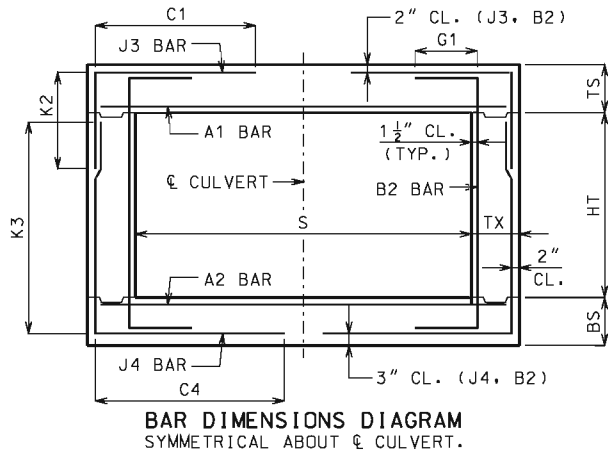
ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

| SPAN (S) = 12 FT | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|------|---------|------|-------|--------|--------|--------------------------------------|------------------|------|------|---------|-------|--------|--------|------|------|-----------|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | |
| | | | | A1 BARS | | | J3 BARS | | | | | | A2 BARS | | | J4 BARS | | | | | | B2 BARS | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | |
| | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | HT=9' | HT=10' | HT=11' | | | | | |
| 1 FT | 11 | 12 | 8 | 6 | 6.5 | 6 | 7 | 91.3 | 31.5 | 34.5 | 37.5 | 6 | 7.5 | 6 | 7 | 91.3 | 116 | 128 | 140 | 5 | 10 | 12 | | |
| 2 FT | 11 | 12 | 8 | 6 | 6 | 6 | 6.5 | 91.3 | 31.5 | 34.5 | 37.5 | 6 | 7 | 6 | 6.5 | 91.3 | 116 | 128 | 140 | 5 | 9.5 | 12 | | |
| 4 FT | 10 | 12 | 8 | 6 | 6 | 6 | 6 | 69.9 | 30.0 | 32.9 | 35.8 | 6 | 6.5 | 6 | 6.5 | 83.6 | 116 | 128 | 140 | 5 | 9.5 | 0 | | |
| 6 FT | 10 | 12 | 8 | 6 | 6.5 | 6 | 6 | 57.8 | 31.3 | 34.3 | 37.3 | 6 | 6 | 6 | 6 | 62.4 | 116 | 128 | 140 | 5 | 9.5 | 0 | | |
| 8 FT | 10 | 12 | 9 | 6 | 6 | 6 | 6 | 52.0 | 31.3 | 34.3 | 37.3 | 7 | 8 | 6 | 6 | 55.1 | 116 | 128 | 140 | 5 | 10 | 0 | | |
| 10 FT | 10 | 12 | 9 | 7 | 7.5 | 7 | 6 | 52.0 | 35.0 | 38.4 | 41.8 | 7 | 7 | 6 | 6 | 50.5 | 116 | 128 | 140 | 5 | 9.5 | 0 | | |
| 12 FT | 11 | 13 | 10 | 7 | 7.5 | 6 | 6 | 49.3 | 33.0 | 36.1 | 39.3 | 7 | 7 | 6 | 6.5 | 49.3 | 117 | 129 | 141 | 5 | 10 | 0 | | |
| 14 FT | 11 | 13 | 10 | 7 | 7.5 | 6 | 6 | 46.3 | 31.8 | 34.8 | 37.8 | 7 | 7 | 6 | 6.5 | 46.3 | 117 | 129 | 141 | 5 | 12 | 0 | | |
| 16 FT | 12 | 14 | 10 | 7 | 7 | 6 | 6.5 | 46.3 | 32.3 | 35.3 | 38.3 | 7 | 6.5 | 6 | 7 | 44.6 | 118 | 130 | 142 | 5 | 11 | 0 | | |
| 18 FT | 13 | 15 | 10 | 7 | 6.5 | 6 | 6 | 44.6 | 38.0 | 41.5 | 45.0 | 7 | 6 | 6 | 7 | 44.6 | 119 | 131 | 143 | 5 | 9.5 | 0 | | |
| 20 FT | 14 | 16 | 10 | 7 | 6 | 7 | 7.5 | 47.8 | 38.6 | 42.0 | 45.5 | 7 | 6 | 6 | 6.5 | 44.6 | 120 | 132 | 144 | 5 | 8.5 | 0 | | |
| 22 FT | 16 | 18 | 11 | 7 | 6.5 | 6 | 6.5 | 51.1 | 37.0 | 40.3 | 43.5 | 7 | 6.5 | 6 | 7.5 | 45.0 | 122 | 134 | 146 | 5 | 8.5 | 0 | | |
| 24 FT | 17 | 19 | 11 | 7 | 6 | 6 | 6 | 49.6 | 37.5 | 40.8 | 44.0 | 7 | 6 | 6 | 7.5 | 45.0 | 123 | 135 | 147 | 5 | 7.5 | 0 | | |
| 26 FT | 18 | 20 | 12 | 7 | 6 | 6 | 6.5 | 49.9 | 38.1 | 41.3 | 44.5 | 7 | 6 | 6 | 7.5 | 45.3 | 124 | 136 | 148 | 5 | 8 | 0 | | |
| 28 FT | 19 | 21 | 12 | 7 | 6 | 6 | 6 | 49.9 | 40.0 | 43.4 | 46.8 | 7 | 6 | 6 | 7.5 | 45.3 | 125 | 137 | 149 | 5 | 7 | 0 | | |
| 30 FT | 20 | 22 | 13 | 8 | 7.5 | 6 | 6.5 | 51.8 | 40.6 | 44.0 | 47.4 | 7 | 6 | 6 | 8 | 45.5 | 126 | 138 | 150 | 5 | 7.5 | 0 | | |
| 32 FT | 21 | 23 | 13 | 8 | 7.5 | 6 | 6 | 50.3 | 41.1 | 44.5 | 47.9 | 8 | 7.5 | 6 | 7.5 | 45.5 | 127 | 139 | 151 | 5 | 7 | 0 | | |
| 34 FT | 21 | 23 | 13 | 8 | 7 | 6 | 6 | 50.3 | 45.6 | 49.3 | 53.0 | 8 | 7 | 6 | 7 | 45.5 | 127 | 139 | 151 | 5 | 6.5 | 0 | | |
| 36 FT | 22 | 24 | 14 | 8 | 7 | 6 | 6 | 52.1 | 43.3 | 46.8 | 50.1 | 8 | 7 | 6 | 7.5 | 45.9 | 128 | 140 | 152 | 5 | 7 | 0 | | |
| 38 FT | 23 | 25 | 14 | 8 | 6.5 | 6 | 6 | 50.5 | 43.8 | 47.3 | 50.8 | 8 | 7 | 6 | 7.5 | 45.9 | 129 | 141 | 153 | 5 | 6 | 0 | | |
| 40 FT | 24 | 26 | 14 | 8 | 6.5 | 6 | 6 | 50.5 | 44.4 | 47.9 | 51.4 | 8 | 7 | 6 | 7 | 45.9 | 130 | 142 | 154 | 5 | 6 | 0 | | |
| 42 FT | 25 | 27 | 15 | 8 | 6.5 | 6 | 6 | 52.5 | 49.6 | 53.5 | 57.3 | 8 | 7 | 6 | 7.5 | 46.1 | 131 | 143 | 155 | 5 | 6 | 0 | | |
| 44 FT | 26 | 28 | 15 | 8 | 6.5 | 6 | 6 | 52.5 | 50.3 | 54.1 | 57.9 | 8 | 6.5 | 6 | 7.5 | 47.8 | 132 | 144 | 156 | 6 | 8 | 0 | | |
| 46 FT | 27 | 28 | 15 | 8 | 6.5 | 6 | 6 | 50.9 | 52.1 | 56.1 | 60.0 | 8 | 6.5 | 6 | 7 | 47.8 | 132 | 144 | 156 | 6 | 8 | 0 | | |
| 48 FT | 27 | 29 | 15 | 8 | 6 | 6 | 6 | 52.5 | 52.5 | 56.4 | 60.4 | 8 | 6.5 | 6 | 7 | 47.8 | 133 | 145 | 157 | 6 | 8 | 0 | | |
| 50 FT | 28 | 30 | 16 | 8 | 6 | 6 | 6 | 52.8 | 53.1 | 57.1 | 61.0 | 8 | 6.5 | 6 | 7.5 | 48.0 | 134 | 146 | 158 | 6 | 8 | 0 | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|-------|---------|-------|------------------|------------------------------------|------|------|---------|-------|-------|-------|-----------|------|----|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 |
| | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | HT=7' | HT=8' | HT=9' | | | |
| 1 FT | 13 | 11 | 8 | 6 | 6.5 | 5 | 8.5 | 95.1 | 34.0 | 38.0 | 41.9 | 6 | 7 | 6 | 7 | 67.3 | 91 | 103 | 115 | 5 | 12 | 12 |
| 2 FT | 13 | 11 | 8 | 6 | 6 | 5 | 6.5 | 95.1 | 34.0 | 38.0 | 41.9 | 6 | 6.5 | 6 | 6.5 | 59.0 | 91 | 103 | 115 | 5 | 12 | 12 |
| 4 FT | 10 | 11 | 8 | 7 | 7.5 | 6 | 6 | 49.3 | 31.0 | 34.8 | 38.5 | 6 | 6 | 6 | 6.5 | 49.3 | 91 | 103 | 115 | 5 | 12 | 0 |
| 6 FT | 10 | 11 | 8 | 7 | 7.5 | 6 | 6 | 45.9 | 34.0 | 38.1 | 42.1 | 7 | 7 | 6 | 6 | 45.9 | 91 | 103 | 115 | 5 | 12 | 0 |
| 8 FT | 10 | 12 | 8 | 7 | 7 | 7 | 6 | 47.5 | 30.3 | 33.9 | 37.5 | 7 | 7 | 6 | 7 | 42.6 | 92 | 104 | 116 | 5 | 12 | 0 |
| 10 FT | 11 | 12 | 8 | 7 | 6.5 | 7 | 6.5 | 44.3 | 35.8 | 39.9 | 44.1 | 7 | 6 | 6 | 6 | 41.0 | 92 | 104 | 116 | 5 | 12 | 0 |
| 12 FT | 12 | 13 | 8 | 7 | 6 | 7 | 6.5 | 42.6 | 36.4 | 40.6 | 44.8 | 7 | 6 | 6 | 6.5 | 39.4 | 93 | 105 | 117 | 5 | 12 | 0 |
| 14 FT | 12 | 14 | 8 | 7 | 6 | 7 | 6.5 | 41.0 | 32.5 | 36.3 | 40.0 | 7 | 6 | 5 | 6 | 32.8 | 94 | 106 | 118 | 5 | 12 | 0 |
| 16 FT | 13 | 15 | 8 | 8 | 7.5 | 7 | 6.5 | 39.4 | 33.1 | 36.9 | 40.6 | 7 | 6 | 5 | 6 | 31.1 | 95 | 107 | 119 | 5 | 12 | 0 |
| 18 FT | 14 | 16 | 8 | 8 | 7 | 7 | 7 | 37.8 | 34.9 | 38.8 | 42.5 | 8 | 7.5 | 6 | 8 | 34.5 | 96 | 108 | 120 | 5 | 12 | 0 |
| 20 FT | 15 | 18 | 8 | 8 | 6.5 | 7 | 7 | 45.9 | 35.9 | 39.6 | 43.5 | 8 | 7.5 | 5 | 6 | 31.1 | 98 | 110 | 122 | 5 | 11.5 | 0 |
| 22 FT | 17 | 19 | 8 | 8 | 7 | 6 | 6 | 41.0 | 38.0 | 41.9 | 45.9 | 8 | 7.5 | 6 | 8 | 34.5 | 99 | 111 | 123 | 5 | 9.5 | 0 |
| 24 FT | 18 | 20 | 8 | 8 | 6.5 | 7 | 7.5 | 45.9 | 38.6 | 42.6 | 46.5 | 8 | 7 | 6 | 7.5 | 34.5 | 100 | 112 | 124 | 5 | 9.5 | 0 |
| 26 FT | 19 | 21 | 9 | 8 | 6.5 | 6 | 6 | 41.3 | 39.3 | 43.3 | 47.3 | 8 | 7 | 5 | 6 | 31.4 | 101 | 113 | 125 | 5 | 9 | 0 |
| 28 FT | 20 | 22 | 10 | 8 | 6.5 | 6 | 6.5 | 41.5 | 41.1 | 45.3 | 49.3 | 8 | 7 | 5 | 6 | 33.3 | 102 | 114 | 126 | 5 | 10 | 0 |
| 30 FT | 21 | 23 | 10 | 8 | 6.5 | 6 | 6.5 | 41.5 | 41.9 | 45.9 | 50.0 | 8 | 6.5 | 5 | 6 | 33.3 | 103 | 115 | 127 | 5 | 9 | 0 |
| 32 FT | 22 | 24 | 10 | 8 | 6 | 6 | 6 | 41.5 | 42.5 | 46.6 | 50.6 | 8 | 6.5 | 5 | 6 | 33.3 | 104 | 116 | 128 | 5 | 8 | 0 |
| 34 FT | 23 | 25 | 11 | 8 | 6 | 6 | 6.5 | 41.8 | 43.1 | 47.3 | 51.4 | 8 | 6.5 | 5 | 6.5 | 33.4 | 105 | 117 | 129 | 5 | 8.5 | 0 |
| 36 FT | 24 | 26 | 11 | 8 | 6 | 6 | 6.5 | 41.8 | 45.1 | 49.4 | 53.5 | 8 | 6.5 | 5 | 6 | 33.4 | 106 | 118 | 130 | 5 | 8 | 0 |
| 38 FT | 25 | 27 | 12 | 8 | 6 | 6 | 6.5 | 42.0 | 45.9 | 50.0 | 54.3 | 8 | 6.5 | 5 | 6 | 33.6 | 107 | 119 | 131 | 5 | 8.5 | 0 |
| 40 FT | 26 | 28 | 12 | 8 | 6 | 6 | 7 | 42.0 | 46.5 | 50.8 | 55.0 | 8 | 6.5 | 5 | 6 | 33.6 | 108 | 120 | 132 | 5 | 7.5 | 0 |
| 42 FT | 27 | 29 | 12 | 9 | 7.5 | 6 | 7 | 42.0 | 51.3 | 55.9 | 60.4 | 8 | 6 | 6 | 8.5 | 37.0 | 109 | 121 | 133 | 5 | 7 | 0 |
| 44 FT | 28 | 30 | 12 | 9 | 7 | 6 | 7 | 42.0 | 52.0 | 56.6 | 61.1 | 8 | 6 | 6 | 8 | 37.0 | 110 | 122 | 134 | 5 | 7 | 0 |
| 46 FT | 29 | 30 | 12 | 9 | 7 | 6 | 7 | 42.0 | 53.9 | 58.5 | 63.1 | 8 | 6 | 6 | 7.5 | 37.0 | 110 | 122 | 134 | 5 | 7 | 0 |
| 48 FT | 30 | 31 | 12 | 9 | 7 | 6 | 7 | 42.0 | 54.6 | 59.3 | 64.0 | 8 | 6 | 6 | 7.5 | 37.0 | 111 | 123 | 135 | 5 | 7 | 0 |
| 50 FT | 30 | 32 | 12 | 9 | 7 | 6 | 6.5 | 42.0 | 55.0 | 59.6 | 64.4 | 8 | 6 | 6 | 7.5 | 37.0 | 112 | 124 | 136 | 5 | 7 | 0 |

| SPAN (S) = 13 FT | | | | | | | | | | | | | HEIGHT (HT) = 13 FT OR 14 FT | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|------------------|------|------------------|------|------------------------------|-----|------------------|------|------|-----------|-----|----|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | BOTTOM SLAB BARS | | | | | | | WALL BARS | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | HT=13' HT=14' | | | | | | HT=13' HT=14' | | | | | | | | | | |
| 1 FT | 12 | 12 | 9 | 6 | 6 | 6 | 6.5 | 99.0 | 36.8 | 39.3 | 6 | 6.5 | 6 | 6 | 99.0 | 164 | 176 | 5 | 8.5 | 12 | | | | | |
| 2 FT | 12 | 12 | 9 | 7 | 8 | 6 | 6.5 | 99.0 | 36.8 | 39.3 | 6 | 6 | 6 | 6 | 99.0 | 164 | 176 | 5 | 8 | 12 | | | | | |
| 4 FT | 10 | 12 | 10 | 6 | 6 | 6 | 6 | 99.6 | 34.6 | 37.0 | 7 | 8 | 6 | 6 | 99.6 | 164 | 176 | 5 | 8 | 0 | | | | | |
| 6 FT | 11 | 13 | 10 | 6 | 6 | 6 | 6.5 | 84.6 | 35.0 | 37.4 | 6 | 6 | 6 | 6.5 | 99.6 | 165 | 177 | 5 | 7.5 | 0 | | | | | |
| 8 FT | 11 | 13 | 10 | 6 | 6 | 7 | 6.5 | 74.8 | 35.0 | 37.4 | 7 | 7 | 6 | 6 | 84.6 | 165 | 177 | 5 | 7 | 0 | | | | | |
| 10 FT | 11 | 13 | 11 | 7 | 7.5 | 7 | 6.5 | 68.5 | 35.0 | 37.4 | 7 | 6.5 | 6 | 6 | 70.1 | 165 | 177 | 5 | 7.5 | 0 | | | | | |
| 12 FT | 12 | 14 | 12 | 7 | 7 | 6 | 6.5 | 62.1 | 37.1 | 39.8 | 7 | 6.5 | 6 | 6.5 | 67.3 | 166 | 178 | 5 | 7 | 0 | | | | | |
| 14 FT | 13 | 15 | 12 | 7 | 7 | 6 | 6 | 62.1 | 37.6 | 40.1 | 7 | 6 | 6 | 6 | 65.5 | 167 | 179 | 5 | 7 | 0 | | | | | |
| 16 FT | 13 | 15 | 12 | 7 | 6.5 | 7 | 7 | 60.5 | 37.6 | 40.1 | 7 | 6 | 6 | 6.5 | 58.8 | 167 | 179 | 5 | 7 | 0 | | | | | |
| 18 FT | 14 | 17 | 13 | 7 | 6.5 | 7 | 8 | 59.1 | 38.3 | 40.8 | 7 | 6 | 6 | 6.5 | 59.1 | 169 | 181 | 5 | 6.5 | 0 | | | | | |
| 20 FT | 15 | 18 | 13 | 7 | 6 | 7 | 7 | 67.6 | 40.5 | 43.1 | 7 | 6 | 6 | 6 | 59.1 | 170 | 182 | 5 | 6.5 | 0 | | | | | |
| 22 FT | 17 | 19 | 14 | 7 | 6 | 7 | 7.5 | 68.0 | 41.1 | 43.8 | 7 | 6 | 6 | 6 | 59.5 | 171 | 183 | 5 | 6 | 0 | | | | | |
| 24 FT | 18 | 20 | 14 | 7 | 6 | 7 | 7.5 | 66.3 | 43.5 | 46.3 | 8 | 7.5 | 6 | 6 | 59.5 | 172 | 184 | 5 | 6 | 0 | | | | | |
| 26 FT | 19 | 21 | 15 | 8 | 7.5 | 7 | 7.5 | 66.8 | 43.9 | 46.8 | 8 | 7 | 6 | 6 | 58.1 | 173 | 185 | 6 | 8 | 0 | | | | | |
| 28 FT | 20 | 22 | 15 | 8 | 7 | 7 | 7 | 66.8 | 44.4 | 47.1 | 8 | 7 | 6 | 6 | 58.1 | 174 | 186 | 6 | 8 | 0 | | | | | |
| 30 FT | 21 | 23 | 16 | 8 | 7 | 7 | 7 | 67.1 | 46.8 | 49.6 | 8 | 7 | 6 | 6 | 58.5 | 175 | 187 | 6 | 8 | 0 | | | | | |
| 32 FT | 22 | 24 | 16 | 8 | 7 | 7 | 7 | 67.1 | 49.3 | 52.3 | 8 | 7 | 7 | 7.5 | 61.9 | 176 | 188 | 6 | 8 | 0 | | | | | |
| 34 FT | 23 | 25 | 17 | 8 | 6.5 | 7 | 7 | 67.5 | 47.8 | 50.6 | 8 | 6.5 | 6 | 6 | 58.9 | 177 | 189 | 6 | 7.5 | 0 | | | | | |
| 36 FT | 24 | 26 | 17 | 8 | 6.5 | 7 | 6.5 | 67.5 | 52.3 | 55.4 | 8 | 6.5 | 7 | 7.5 | 62.3 | 178 | 190 | 6 | 7.5 | 0 | | | | | |
| 38 FT | 25 | 27 | 18 | 8 | 6.5 | 7 | 7 | 67.9 | 50.8 | 53.8 | 8 | 6.5 | 6 | 6 | 59.1 | 179 | 191 | 6 | 7 | 0 | | | | | |
| 40 FT | 25 | 28 | 18 | 8 | 6 | 7 | 6 | 67.9 | 51.0 | 54.0 | 8 | 6.5 | 6 | 6 | 59.1 | 180 | 192 | 6 | 7 | 0 | | | | | |
| 42 FT | 26 | 29 | 19 | 8 | 6 | 7 | 6.5 | 68.3 | 51.5 | 54.5 | 8 | 6.5 | 6 | 6 | 59.5 | 181 | 193 | 6 | 6.5 | 0 | | | | | |
| 44 FT | 27 | 30 | 19 | 8 | 6 | 7 | 6 | 68.3 | 52.0 | 55.0 | 8 | 6 | 6 | 6 | 59.5 | 182 | 194 | 6 | 6.5 | 0 | | | | | |
| 46 FT | 28 | 31 | 20 | 8 | 6 | 7 | 6.5 | 68.6 | 52.5 | 55.5 | 8 | 6 | 6 | 6 | 59.9 | 183 | 195 | 6 | 6.5 | 0 | | | | | |
| 48 FT | 29 | 31 | 20 | 8 | 6 | 7 | 6 | 68.6 | 57.0 | 60.3 | 8 | 6 | 7 | 7.5 | 63.4 | 183 | 195 | 6 | 6.5 | 0 | | | | | |
| 50 FT | 30 | 32 | 21 | 9 | 7.5 | 7 | 7 | 69.0 | 55.4 | 58.5 | 8 | 6 | 6 | 6 | 60.1 | 184 | 196 | 6 | 6 | 0 | | | | | |



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

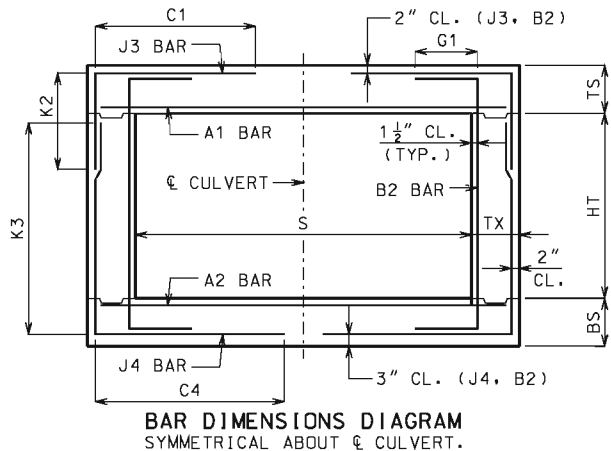
| SPAN (S) = 13 FT | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|------|--------|---------|--------|------------------|---------------------------------------|------|------|---------|--------|--------|--------|-----------|------|----|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | A2 BARS | | J4 BARS | | | | B2 BARS | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | |
| | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | HT=10' | HT=11' | HT=12' | | | | | | |
| 1 FT | 12 | 12 | 9 | 6 | 6.5 | 5 | 6 | 95.8 | 33.4 | 36.3 | 39.1 | 6 | 7 | 6 | 6.5 | 99.0 | 128 | 140 | 152 | 5 | 9 | 12 | | | |
| 2 FT | 12 | 13 | 9 | 6 | 6 | 6 | 7 | 99.0 | 32.3 | 35.0 | 37.8 | 6 | 6.5 | 6 | 7 | 99.0 | 129 | 141 | 153 | 5 | 9 | 12 | | | |
| 4 FT | 10 | 11 | 9 | 7 | 7.5 | 6 | 6 | 72.6 | 34.0 | 37.0 | 40.0 | 7 | 7.5 | 6 | 6 | 77.5 | 127 | 139 | 151 | 5 | 8.5 | 0 | | | |
| 6 FT | 10 | 11 | 10 | 6 | 6 | 6 | 6 | 61.4 | 34.0 | 37.0 | 40.0 | 7 | 7.5 | 6 | 6 | 63.1 | 127 | 139 | 151 | 5 | 9 | 0 | | | |
| 8 FT | 10 | 12 | 10 | 7 | 7.5 | 7 | 6 | 59.8 | 34.3 | 37.3 | 40.3 | 7 | 7 | 6 | 6.5 | 59.8 | 128 | 140 | 152 | 5 | 9 | 0 | | | |
| 10 FT | 11 | 13 | 10 | 7 | 7 | 6 | 6 | 54.8 | 36.1 | 39.3 | 42.4 | 7 | 6.5 | 6 | 6.5 | 56.5 | 129 | 141 | 153 | 5 | 8.5 | 0 | | | |
| 12 FT | 12 | 14 | 10 | 7 | 6.5 | 6 | 6 | 51.5 | 33.9 | 36.8 | 39.6 | 7 | 6.5 | 6 | 6 | 53.1 | 130 | 142 | 154 | 5 | 8 | 0 | | | |
| 14 FT | 12 | 14 | 10 | 7 | 6.5 | 6 | 6 | 48.1 | 33.9 | 36.8 | 39.6 | 7 | 6 | 6 | 6 | 48.1 | 130 | 142 | 154 | 5 | 9.5 | 0 | | | |
| 16 FT | 13 | 15 | 10 | 7 | 6 | 7 | 7 | 51.5 | 34.4 | 37.3 | 40.1 | 7 | 6 | 6 | 6 | 48.1 | 131 | 143 | 155 | 5 | 8 | 0 | | | |
| 18 FT | 14 | 16 | 11 | 7 | 6 | 7 | 7.5 | 51.8 | 39.1 | 42.4 | 45.6 | 8 | 7.5 | 6 | 6.5 | 48.4 | 132 | 144 | 156 | 5 | 8.5 | 0 | | | |
| 20 FT | 15 | 18 | 11 | 8 | 7.5 | 7 | 7 | 58.5 | 37.0 | 40.0 | 43.0 | 8 | 7.5 | 6 | 7 | 46.8 | 134 | 146 | 158 | 5 | 7.5 | 0 | | | |
| 22 FT | 17 | 19 | 12 | 8 | 7.5 | 6 | 6 | 53.8 | 39.3 | 42.4 | 45.5 | 8 | 7.5 | 6 | 7 | 48.8 | 135 | 147 | 159 | 5 | 7.5 | 0 | | | |
| 24 FT | 18 | 20 | 12 | 8 | 7 | 7 | 7.5 | 58.8 | 39.8 | 42.9 | 46.0 | 8 | 7 | 6 | 6.5 | 48.8 | 136 | 148 | 160 | 5 | 7 | 0 | | | |
| 26 FT | 19 | 21 | 13 | 8 | 7 | 7 | 8 | 59.1 | 40.3 | 43.4 | 46.5 | 8 | 7 | 6 | 7 | 49.0 | 137 | 149 | 161 | 5 | 7 | 0 | | | |
| 28 FT | 20 | 22 | 13 | 8 | 7 | 7 | 7.5 | 59.1 | 42.4 | 45.6 | 48.9 | 8 | 7 | 6 | 6.5 | 49.0 | 138 | 150 | 162 | 5 | 6.5 | 0 | | | |
| 30 FT | 21 | 23 | 14 | 8 | 7 | 7 | 8 | 59.5 | 46.1 | 49.6 | 53.1 | 8 | 7 | 6 | 7 | 49.3 | 139 | 151 | 163 | 5 | 7 | 0 | | | |
| 32 FT | 22 | 24 | 14 | 8 | 6.5 | 7 | 7.5 | 59.5 | 46.8 | 50.1 | 53.6 | 8 | 6.5 | 6 | 6.5 | 49.3 | 140 | 152 | 164 | 5 | 6 | 0 | | | |
| 34 FT | 23 | 25 | 14 | 8 | 6.5 | 7 | 7 | 59.5 | 44.0 | 47.3 | 50.5 | 8 | 6.5 | 6 | 6.5 | 49.3 | 141 | 153 | 165 | 5 | 6 | 0 | | | |
| 36 FT | 24 | 26 | 15 | 8 | 6.5 | 7 | 7.5 | 59.9 | 49.5 | 53.1 | 56.8 | 8 | 6.5 | 6 | 6.5 | 49.6 | 142 | 154 | 166 | 5 | 6 | 0 | | | |
| 38 FT | 25 | 27 | 15 | 8 | 6 | 7 | 7.5 | 59.9 | 50.1 | 53.8 | 57.3 | 8 | 6.5 | 6 | 6.5 | 49.6 | 143 | 155 | 167 | 6 | 8 | 0 | | | |
| 40 FT | 26 | 28 | 15 | 8 | 6 | 7 | 7 | 59.9 | 50.8 | 54.3 | 57.9 | 8 | 6.5 | 6 | 6.5 | 49.6 | 144 | 156 | 168 | 6 | 8 | 0 | | | |
| 42 FT | 27 | 29 | 16 | 8 | 6 | 7 | 7.5 | 60.3 | 51.3 | 54.9 | 58.5 | 8 | 6 | 6 | 6.5 | 49.9 | 145 | 157 | 169 | 6 | 8 | 0 | | | |
| 44 FT | 28 | 30 | 16 | 8 | 6 | 7 | 7.5 | 60.3 | 53.6 | 57.4 | 61.1 | 8 | 6 | 6 | 6.5 | 49.9 | 146 | 158 | 170 | 6 | 8 | 0 | | | |
| 46 FT | 28 | 30 | 16 | 9 | 7 | 7 | 6.5 | 60.3 | 53.6 | 57.4 | 61.1 | 8 | 6 | 6 | 6 | 49.9 | 146 | 158 | 170 | 6 | 8 | 0 | | | |
| 48 FT | 29 | 31 | 17 | 9 | 7 | 7 | 7.5 | 60.5 | 54.3 | 58.0 | 61.8 | 8 | 6 | 6 | 6.5 | 50.1 | 147 | 159 | 171 | 6 | 7.5 | 0 | | | |
| 50 FT | 30 | 32 | 17 | 9 | 7 | 7 | 7.5 | 60.5 | 54.9 | 58.6 | 62.3 | 8 | 6 | 6 | 6.5 | 50.1 | 148 | 160 | 172 | 6 | 7.5 | 0 | | | |

| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | |
|------------------|------------------|----|----|---------------|------|---------|------|-------|-------|-------|-------|---------|------------------|---------|------|------|-------|-------|------------------------------------|---------|------|-----------|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | | A2 BARS | | J4 BARS | | | | | | B2 BARS | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | |
| | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | |
| 1 FT | 13 | 12 | 8 | 6 | 6 | 5 | 7 | 102.1 | 33.3 | 37.1 | 41.0 | 6 | 6.5 | 6 | 6.5 | 66.9 | 92 | 104 | 116 | 5 | 12 | 12 | | | | | | |
| 2 FT | 13 | 12 | 8 | 7 | 8 | 5 | 6 | 102.1 | 33.3 | 37.1 | 41.0 | 6 | 6 | 6 | 6 | 58.1 | 92 | 104 | 116 | 5 | 12 | 12 | | | | | | |
| 4 FT | 10 | 11 | 8 | 7 | 6.5 | 7 | 6 | 52.8 | 34.0 | 38.1 | 42.1 | 7 | 7 | 6 | 6 | 49.3 | 91 | 103 | 115 | 5 | 12 | 0 | | | | | | |
| 6 FT | 11 | 12 | 8 | 7 | 7 | 6 | 6 | 45.8 | 31.6 | 35.4 | 39.0 | 7 | 7 | 6 | 7 | 44.0 | 92 | 104 | 116 | 5 | 12 | 0 | | | | | | |
| 8 FT | 11 | 12 | 8 | 7 | 6.5 | 7 | 6.5 | 45.8 | 35.8 | 39.9 | 44.1 | 7 | 6 | 6 | 6 | 42.3 | 92 | 104 | 116 | 5 | 12 | 0 | | | | | | |
| 10 FT | 12 | 13 | 8 | 7 | 6 | 7 | 6.5 | 44.0 | 33.3 | 37.1 | 41.0 | 8 | 7.5 | 6 | 6.5 | 38.8 | 93 | 105 | 117 | 5 | 12 | 0 | | | | | | |
| 12 FT | 12 | 14 | 8 | 8 | 7 | 7 | 6 | 42.3 | 36.8 | 41.0 | 45.1 | 8 | 7 | 6 | 7 | 37.0 | 94 | 106 | 118 | 5 | 12 | 0 | | | | | | |
| 14 FT | 13 | 16 | 8 | 8 | 6.5 | 7 | 6 | 42.3 | 33.5 | 37.3 | 40.9 | 8 | 7 | 5 | 6 | 31.6 | 96 | 108 | 120 | 5 | 12 | 0 | | | | | | |
| 16 FT | 13 | 16 | 8 | 8 | 6.5 | 7 | 6 | 40.5 | 33.5 | 37.3 | 40.9 | 8 | 7 | 5 | 6 | 31.6 | 96 | 108 | 120 | 5 | 12 | 0 | | | | | | |
| 18 FT | 15 | 17 | 8 | 8 | 6.5 | 7 | 7 | 45.8 | 35.5 | 39.4 | 43.3 | 8 | 6.5 | 6 | 7.5 | 35.3 | 97 | 109 | 121 | 5 | 12 | 0 | | | | | | |
| 20 FT | 16 | 19 | 8 | 8 | 6 | 7 | 6.5 | 45.8 | 36.5 | 40.4 | 44.1 | 8 | 7 | 5 | 6 | 31.6 | 99 | 111 | 123 | 5 | 11.5 | 0 | | | | | | |
| 22 FT | 18 | 20 | 8 | 8 | 6 | 7 | 7.5 | 45.8 | 38.6 | 42.6 | 46.5 | 8 | 6.5 | 6 | 7.5 | 35.3 | 100 | 112 | 124 | 5 | 9.5 | 0 | | | | | | |
| 24 FT | 19 | 21 | 8 | 8 | 6 | 7 | 7 | 45.8 | 44.0 | 48.5 | 52.9 | 8 | 6.5 | 6 | 7.5 | 35.3 | 101 | 113 | 125 | 5 | 9.5 | 0 | | | | | | |
| 26 FT | 21 | 23 | 9 | 8 | 6 | 6 | 6.5 | 42.5 | 41.9 | 45.9 | 50.0 | 8 | 6.5 | 5 | 6 | 33.6 | 103 | 115 | 127 | 5 | 8.5 | 0 | | | | | | |
| 28 FT | 22 | 24 | 9 | 8 | 6 | 6 | 6 | 42.5 | 46.3 | 50.8 | 55.1 | 8 | 6.5 | 6 | 7 | 35.4 | 104 | 116 | 128 | 5 | 8.5 | 0 | | | | | | |
| 30 FT | 23 | 25 | 10 | 8 | 6 | 6 | 6.5 | 42.8 | 43.1 | 47.3 | 51.4 | 8 | 6.5 | 5 | 6 | 33.9 | 105 | 117 | 129 | 5 | 8.5 | 0 | | | | | | |
| 32 FT | 24 | 26 | 10 | 9 | 7.5 | 6 | 6 | 42.8 | 45.1 | 49.4 | 53.5 | 8 | 6 | 5 | 6 | 33.9 | 106 | 118 | 130 | 5 | 8 | 0 | | | | | | |
| 34 FT | 25 | 27 | 11 | 9 | 7 | 6 | 7 | 43.0 | 45.9 | 50.0 | 54.3 | 8 | 6 | 5 | 6 | 34.0 | 107 | 119 | 131 | 5 | 8.5 | 0 | | | | | | |
| 36 FT | 26 | 28 | 11 | 9 | 7 | 6 | 7 | 43.0 | 46.5 | 50.8 | 55.0 | 8 | 6 | 5 | 6 | 34.0 | 108 | 120 | 132 | 5 | 7.5 | 0 | | | | | | |
| 38 FT | 27 | 29 | 11 | 9 | 7 | 6 | 7 | 43.0 | 51.3 | 55.9 | 60.4 | 8 | 6 | 6 | 7.5 | 37.6 | 109 | 121 | 133 | 5 | 7.5 | 0 | | | | | | |
| 40 FT | 28 | 30 | 11 | 9 | 7 | 6 | 6.5 | 43.0 | 52.0 | 56.6 | 61.1 | 8 | 6 | 6 | 7 | 37.6 | 110 | 122 | 134 | 5 | 7.5 | 0 | | | | | | |
| 42 FT | 29 | 31 | 12 | 9 | 6.5 | 6 | 7 | 43.3 | 54.3 | 58.9 | 63.6 | 9 | 7.5 | 6 | 7.5 | 37.8 | 111 | 123 | 135 | 5 | 7 | 0 | | | | | | |
| 44 FT | 30 | 32 | 12 | 9 | 6.5 | 6 | 7 | 43.3 | 55.0 | 59.6 | 64.4 | 9 | 7 | 6 | 7.5 | 37.8 | 112 | 124 | 136 | 5 | 7 | 0 | | | | | | |
| 46 FT | 31 | 33 | 12 | 9 | 6.5 | 6 | 7 | 43.3 | 55.8 | 60.5 | 65.1 | 9 | 7 | 6 | 7 | 37.8 | 113 | 125 | 137 | 5 | 7 | 0 | | | | | | |
| 48 FT | 32 | 33 | 12 | 9 | 6.5 | 6 | 7 | 43.3 | 56.1 | 60.9 | 65.5 | 9 | 7 | 6 | 7 | 37.8 | 113 | 125 | 137 | 5 | 7 | 0 | | | | | | |
| 50 FT | 33 | 34 | 12 | 9 | 6.5 | 6 | 7 | 43.3 | 58.4 | 63.3 | 68.0 | 9 | 7 | 6 | 7 | 37.8 | 114 | 126 | 138 | 5 | 6.5 | 0 | | | | | | |

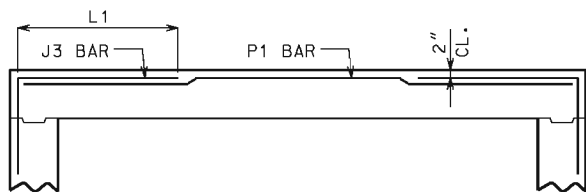
| SPAN (S) = 14 FT | | | | | | | | | | | HEIGHT (HT) = 13 FT OR 14 FT | | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|-------|--------|--------|------------------------------|------------------|------|---------|-------|--------|--------|------|------|-----------|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | BOTTOM SLAB BARS | | | | | | | | WALL BARS | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | | A2 BARS | | J4 BARS | | | | | | B2 BARS | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | G1 | | | | |
| | | | | | | | | | HT=13' | HT=14' | | | | | | HT=13' | HT=14' | | | | | | | |
| 1 FT | 12 | 12 | 10 | 6 | 6 | 6 | 7 | 105.0 | 36.8 | 39.3 | 6 | 6 | 6 | 6 | 105.0 | 164 | 176 | 5 | 8 | 12 | | | | |
| 2 FT | 13 | 13 | 10 | 7 | 8 | 6 | 7 | 105.0 | 35.4 | 37.8 | 7 | 8 | 6 | 6.5 | 105.0 | 165 | 177 | 5 | 8 | 12 | | | | |
| 4 FT | 11 | 12 | 10 | 7 | 7.5 | 6 | 6.5 | 105.0 | 36.5 | 39.0 | 7 | 7 | 6 | 6 | 105.0 | 164 | 176 | 5 | 8 | 0 | | | | |
| 6 FT | 11 | 13 | 10 | 7 | 7.5 | 6 | 6 | 76.5 | 35.0 | 37.4 | 7 | 7 | 6 | 6 | 87.3 | 165 | 177 | 5 | 8 | 0 | | | | |
| 8 FT | 11 | 13 | 11 | 7 | 7.5 | 6 | 6 | 66.3 | 35.0 | 37.4 | 7 | 6.5 | 6 | 6 | 71.6 | 165 | 177 | 5 | 7.5 | 0 | | | | |
| 10 FT | 12 | 14 | 11 | 7 | 7 | 6 | 6 | 64.5 | 37.1 | 39.8 | 7 | 6 | 6 | 6 | 68.0 | 166 | 178 | 5 | 7.5 | 0 | | | | |
| 12 FT | 13 | 15 | 12 | 7 | 6.5 | 6 | 6 | 61.3 | 37.6 | 40.1 | 7 | 6 | 6 | 6.5 | 64.8 | 167 | 179 | 5 | 7 | 0 | | | | |
| 14 FT | 14 | 16 | 13 | 7 | 6.5 | 6 | 6 | 59.8 | 38.0 | 40.5 | 7 | 6 | 6 | 6.5 | 63.4 | 168 | 180 | 5 | 6.5 | 0 | | | | |
| 16 FT | 14 | 16 | 13 | 7 | 6 | 7 | 8 | 59.8 | 38.0 | 40.5 | 8 | 7.5 | 6 | 6 | 56.1 | 168 | 180 | 5 | 7.5 | 0 | | | | |
| 18 FT | 15 | 18 | 13 | 7 | 6 | 7 | 7 | 67.0 | 40.5 | 43.1 | 8 | 7.5 | 6 | 6.5 | 56.1 | 170 | 182 | 5 | 6.5 | 0 | | | | |
| 20 FT | 16 | 19 | 13 | 8 | 7 | 7 | 6.5 | 65.1 | 40.9 | 43.5 | 8 | 7 | 6 | 6 | 56.1 | 171 | 183 | 5 | 6.5 | 0 | | | | |
| 22 FT | 18 | 20 | 14 | 8 | 7 | 7 | 7 | 65.5 | 43.5 | 46.3 | 8 | 7 | 6 | 6 | 56.4 | 172 | 184 | 5 | 6 | 0 | | | | |
| 24 FT | 19 | 22 | 14 | 8 | 7 | 7 | 7 | 65.5 | 44.1 | 46.9 | 8 | 7 | 6 | 6 | 56.4 | 174 | 186 | 5 | 6 | 0 | | | | |
| 26 FT | 20 | 23 | 15 | 8 | 6.5 | 7 | 7 | 65.9 | 44.6 | 47.4 | 8 | 6.5 | 6 | 6 | 56.8 | 175 | 187 | 6 | 8 | 0 | | | | |
| 28 FT | 21 | 24 | 15 | 8 | 6.5 | 7 | 6.5 | 65.9 | 45.1 | 47.9 | 8 | 6.5 | 6 | 6 | 56.8 | 176 | 188 | 6 | 8 | 0 | | | | |
| 30 FT | 22 | 25 | 16 | 8 | 6.5 | 7 | 6.5 | 66.3 | 47.5 | 50.4 | 8 | 6.5 | 6 | 6 | 57.0 | 177 | 189 | 6 | 8 | 0 | | | | |
| 32 FT | 23 | 26 | 16 | 8 | 6 | 7 | 6 | 66.3 | 50.0 | 53.0 | 8 | 6 | 7 | 8 | 58.9 | 178 | 190 | 6 | 8 | 0 | | | | |
| 34 FT | 24 | 27 | 17 | 8 | 6 | 7 | 6 | 66.6 | 48.5 | 51.4 | 8 | 6 | 6 | 6 | 57.4 | 179 | 191 | 6 | 7.5 | 0 | | | | |
| 36 FT | 25 | 28 | 17 | 8 | 6 | 7 | 6 | 66.6 | 53.0 | 56.1 | 8 | 6 | 7 | 8 | 59.3 | 180 | 192 | 6 | 7.5 | 0 | | | | |
| 38 FT | 26 | 29 | 18 | 9 | 7.5 | 7 | 6 | 67.0 | 51.5 | 54.5 | 8 | 6 | 6 | 6 | 57.6 | 181 | 193 | 6 | 7 | 0 | | | | |
| 40 FT | 27 | 30 | 18 | 9 | 7 | 7 | 6 | 67.0 | 54.1 | 57.3 | 8 | 6 | 7 | 8 | 61.4 | 182 | 194 | 6 | 7 | 0 | | | | |
| 42 FT | 28 | 31 | 19 | 9 | 7 | 7 | 6 | 67.4 | 52.5 | 55.5 | 9 | 7.5 | 6 | 6 | 58.0 | 183 | 195 | 6 | 6.5 | 0 | | | | |
| 44 FT | 29 | 32 | 19 | 9 | 7 | 7 | 6 | 67.4 | 57.3 | 60.5 | 9 | 7 | 7 | 8 | 61.8 | 184 | 196 | 6 | 6.5 | 0 | | | | |
| 46 FT | 30 | 33 | 20 | 9 | 7 | 7 | 6.5 | 67.6 | 55.6 | 58.8 | 9 | 7 | 6 | 6 | 58.3 | 185 | 197 | 6 | 6.5 | 0 | | | | |
| 48 FT | 31 | 34 | 20 | 9 | 6.5 | 7 | 6 | 67.6 | 58.4 | 61.5 | 9 | 7 | 7 | 8 | 62.0 | 186 | 198 | 6 | 6.5 | 0 | | | | |
| 50 FT | 32 | 35 | 21 | 9 | 6.5 | 7 | 6.5 | 69.9 | 56.6 | 59.8 | 9 | 7 | 6 | 6 | 58.6 | 187 | 199 | 6 | 6 | 0 | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | |
|------------------|------------------|----|----|---------------|------|---------|------|-------|-------|-------|---------|------|------------------|------|-------------------------------------|------|-------|---------|--------|------|------|-----------|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | |
| 1 FT | 12 | 13 | 8 | 7 | 7 | 6 | 7 | 109.0 | 32.5 | 35.9 | 39.3 | 6 | 6 | 6 | 7 | 82.8 | 105 | 117 | 129 | 5 | 12 | 12 | | | | | | | |
| 2 FT | 12 | 13 | 8 | 7 | 6.5 | 6 | 6.5 | 109.0 | 33.6 | 37.1 | 40.6 | 7 | 7.5 | 6 | 6.5 | 65.8 | 105 | 117 | 129 | 5 | 12 | 12 | | | | | | | |
| 4 FT | 11 | 12 | 8 | 7 | 6 | 6 | 6 | 52.6 | 35.4 | 39.0 | 42.8 | 7 | 7 | 6 | 6 | 52.6 | 104 | 116 | 128 | 5 | 12 | 0 | | | | | | | |
| 6 FT | 11 | 12 | 9 | 7 | 6.5 | 6 | 6 | 51.0 | 35.4 | 39.0 | 42.8 | 7 | 6.5 | 6 | 6 | 49.1 | 104 | 116 | 128 | 5 | 12 | 0 | | | | | | | |
| 8 FT | 11 | 12 | 9 | 7 | 6 | 7 | 6 | 51.0 | 35.4 | 39.0 | 42.8 | 8 | 7.5 | 6 | 6 | 47.3 | 104 | 116 | 128 | 5 | 12 | 0 | | | | | | | |
| 10 FT | 12 | 14 | 9 | 8 | 7.5 | 7 | 6 | 49.1 | 32.8 | 36.1 | 39.5 | 8 | 7 | 6 | 7 | 43.5 | 106 | 118 | 130 | 5 | 12 | 0 | | | | | | | |
| 12 FT | 13 | 15 | 9 | 8 | 6.5 | 7 | 6.5 | 47.3 | 34.5 | 38.0 | 41.5 | 8 | 6.5 | 6 | 7 | 41.6 | 107 | 119 | 131 | 5 | 12 | 0 | | | | | | | |
| 14 FT | 14 | 17 | 9 | 8 | 6.5 | 7 | 6.5 | 45.4 | 34.1 | 37.5 | 40.9 | 8 | 6.5 | 6 | 8 | 39.8 | 109 | 121 | 133 | 5 | 12 | 0 | | | | | | | |
| 16 FT | 14 | 17 | 9 | 8 | 6 | 7 | 6 | 43.5 | 34.1 | 37.5 | 40.9 | 8 | 6.5 | 6 | 8 | 37.8 | 109 | 121 | 133 | 5 | 12 | 0 | | | | | | | |
| 18 FT | 16 | 19 | 9 | 8 | 6 | 7 | 7 | 49.1 | 36.5 | 40.0 | 43.5 | 8 | 6.5 | 6 | 8 | 37.8 | 111 | 123 | 135 | 5 | 12 | 0 | | | | | | | |
| 20 FT | 17 | 20 | 9 | 9 | 7.5 | 7 | 6 | 49.1 | 37.1 | 40.6 | 44.1 | 8 | 6.5 | 6 | 7.5 | 37.8 | 112 | 124 | 136 | 5 | 11 | 0 | | | | | | | |
| 22 FT | 19 | 21 | 9 | 9 | 7.5 | 7 | 7 | 49.1 | 43.3 | 47.3 | 51.1 | 8 | 6 | 6 | 7 | 37.8 | 113 | 125 | 137 | 5 | 9 | 0 | | | | | | | |
| 24 FT | 21 | 23 | 10 | 8 | 6 | 6 | 6 | 43.8 | 41.9 | 45.6 | 49.3 | 8 | 6 | 6 | 8 | 38.0 | 115 | 127 | 139 | 5 | 9 | 0 | | | | | | | |
| 26 FT | 22 | 24 | 11 | 9 | 7.5 | 6 | 6 | 43.9 | 42.5 | 46.3 | 49.9 | 8 | 6 | 6 | 8 | 38.3 | 116 | 128 | 140 | 5 | 10.5 | 0 | | | | | | | |
| 28 FT | 23 | 25 | 11 | 9 | 7 | 6 | 6 | 43.9 | 43.1 | 46.8 | 50.5 | 8 | 6 | 6 | 8 | 38.3 | 117 | 129 | 141 | 5 | 9 | 0 | | | | | | | |
| 30 FT | 24 | 26 | 11 | 9 | 7 | 7 | 7.5 | 49.6 | 49.4 | 53.5 | 57.8 | 9 | 7.5 | 6 | 7 | 38.3 | 118 | 130 | 142 | 5 | 8 | 0 | | | | | | | |
| 32 FT | 26 | 28 | 12 | 9 | 7 | 6 | 6.5 | 46.1 | 46.4 | 50.3 | 54.1 | 8 | 6 | 6 | 8.5 | 38.4 | 120 | 132 | 144 | 5 | 8 | 0 | | | | | | | |
| 34 FT | 27 | 29 | 12 | 9 | 7 | 6 | 6.5 | 46.1 | 51.5 | 55.6 | 59.9 | 9 | 7.5 | 6 | 8 | 38.4 | 121 | 133 | 145 | 5 | 7.5 | 0 | | | | | | | |
| 36 FT | 28 | 30 | 12 | 9 | 6.5 | 6 | 6.5 | 46.1 | 52.1 | 56.4 | 60.5 | 9 | 7 | 6 | 8 | 38.4 | 122 | 134 | 146 | 5 | 7 | 0 | | | | | | | |
| 38 FT | 29 | 31 | 12 | 9 | 6.5 | 6 | 6 | 46.1 | 54.4 | 58.6 | 63.0 | 9 | 7 | 6 | 7.5 | 38.4 | 123 | 135 | 147 | 5 | 7 | 0 | | | | | | | |
| 40 FT | 30 | 32 | 13 | 9 | 6.5 | 6 | 6.5 | 46.4 | 55.1 | 59.4 | 63.8 | 9 | 7 | 6 | 7.5 | 40.5 | 124 | 136 | 148 | 5 | 6.5 | 0 | | | | | | | |
| 42 FT | 31 | 33 | 13 | 9 | 6.5 | 6 | 6.5 | 46.4 | 55.8 | 60.1 | 64.5 | 9 | 7 | 6 | 7 | 40.5 | 125 | 137 | 149 | 5 | 6.5 | 0 | | | | | | | |
| 44 FT | 32 | 34 | 13 | 9 | 6 | 6 | 6.5 | 46.4 | 56.5 | 60.9 | 65.1 | 9 | 6.5 | 6 | 7 | 40.5 | 126 | 138 | 150 | 5 | 6.5 | 0 | | | | | | | |
| 46 FT | 33 | 35 | 13 | 9 | 6 | 6 | 6.5 | 46.4 | 57.3 | 61.5 | 65.9 | 9 | 6.5 | 6 | 6.5 | 40.5 | 127 | 139 | 151 | 5 | 6.5 | 0 | | | | | | | |
| 48 FT | 34 | 36 | 13 | 9 | 6 | 6 | 6.5 | 46.4 | 59.6 | 64.0 | 68.5 | 9 | 6.5 | 6 | 6.5 | 40.5 | 128 | 140 | 152 | 5 | 6.5 | 0 | | | | | | | |
| 50 FT | 35 | 36 | 13 | 9 | 6 | 6 | 6.5 | 46.4 | 60.0 | 64.4 | 68.9 | 9 | 6.5 | 6 | 6 | 40.5 | 128 | 140 | 152 | 5 | 6 | 0 | | | | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|-------|--------|--------|---------|------|------------------|------|---------------------------------------|-------|--------|---------|--------|------|------|-----------|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | HT=14' | HT=15' | HT=16' | | | | | | HT=14' | HT=15' | HT=16' | | | | | | | | | | |
| 1 FT | 13 | 14 | 11 | 7 | 8 | 6 | 7.5 | 112.8 | 36.1 | 38.4 | 40.6 | 7 | 8 | 6 | 7 | 112.8 | 178 | 190 | 202 | 5 | 7.5 | 12 | | | | | | | |
| 2 FT | 13 | 14 | 11 | 7 | 7.5 | 6 | 6.5 | 112.8 | 38.0 | 40.4 | 42.8 | 7 | 7.5 | 6 | 6.5 | 112.8 | 178 | 190 | 202 | 5 | 7 | 12 | | | | | | | |
| 4 FT | 12 | 13 | 11 | 7 | 7 | 6 | 6.5 | 112.8 | 37.6 | 40.0 | 42.4 | 7 | 7 | 6 | 6 | 112.8 | 177 | 189 | 201 | 5 | 6.5 | 0 | | | | | | | |
| 6 FT | 12 | 13 | 12 | 7 | 7.5 | 6 | 6.5 | 92.1 | 37.6 | 40.0 | 42.4 | 7 | 6.5 | 6 | 6 | 97.9 | 177 | 189 | 201 | 5 | 6.5 | 0 | | | | | | | |
| 8 FT | 12 | 14 | 13 | 7 | 7.5 | 6 | 6 | 77.3 | 37.8 | 40.3 | 42.6 | 7 | 6.5 | 6 | 6 | 84.9 | 178 | 190 | 202 | 5 | 6.5 | 0 | | | | | | | |
| 10 FT | 13 | 15 | 13 | 7 | 6.5 | 6 | 6 | 73.4 | 38.3 | 40.6 | 43.0 | 7 | 6 | 6 | 6 | 81.0 | 179 | 191 | 203 | 5 | 6.5 | 0 | | | | | | | |
| 12 FT | 14 | 16 | 14 | 7 | 6.5 | 7 | 8 | 73.8 | 38.6 | 41.0 | 43.4 | 8 | 7.5 | 6 | 6 | 75.6 | 180 | 192 | 204 | 5 | 6 | 0 | | | | | | | |
| 14 FT | 15 | 17 | 14 | 7 | 6 | 7 | 7 | 81.5 | 41.0 | 43.5 | 46.0 | 8 | 7 | 7 | 7.5 | 75.6 | 181 | 193 | 205 | 5 | 6 | 0 | | | | | | | |
| 16 FT | 16 | 18 | 15 | 8 | 7.5 | 7 | 7 | 80.0 | 45.3 | 48.1 | 50.9 | 8 | 7 | 7 | 7 | 74.1 | 182 | 194 | 206 | 6 | 8 | 0 | | | | | | | |
| 18 FT | 16 | 19 | 15 | 8 | 7 | 7 | 7 | 74.1 | 41.6 | 44.1 | 46.6 | 8 | 7 | 7 | 7.5 | 70.3 | 183 | 195 | 207 | 6 | 8 | 0 | | | | | | | |
| 20 FT | 17 | 20 | 15 | 8 | 7 | 7 | 6 | 74.1 | 46.0 | 48.8 | 51.5 | 8 | 6.5 | 7 | 7 | 68.3 | 184 | 196 | 208 | 6 | 8 | 0 | | | | | | | |
| 22 FT | 19 | 21 | 15 | 8 | 6.5 | 7 | 6 | 74.1 | 50.8 | 53.8 | 56.8 | 8 | 6 | 7 | 6 | 68.3 | 185 | 197 | 209 | 6 | 8 | 0 | | | | | | | |
| 24 FT | 20 | 23 | 16 | 8 | 6.5 | 7 | 6 | 74.5 | 47.4 | 50.1 | 52.9 | 8 | 6 | 7 | 6.5 | 68.6 | 187 | 199 | 211 | 6 | 8 | 0 | | | | | | | |
| 26 FT | 21 | 24 | 17 | 8 | 6 | 7 | 6 | 72.9 | 49.9 | 52.8 | 55.6 | 8 | 6 | 7 | 7 | 69.0 | 188 | 200 | 212 | 6 | 7.5 | 0 | | | | | | | |
| 28 FT | 23 | 25 | 17 | 8 | 6 | 7 | 6 | 72.9 | 54.9 | 58.0 | 61.1 | 8 | 6 | 7 | 6 | 69.0 | 189 | 201 | 213 | 6 | 7.5 | 0 | | | | | | | |
| 30 FT | 24 | 27 | 18 | 8 | 6 | 7 | 6 | 73.3 | 51.4 | 54.3 | 57.1 | 8 | 6 | 7 | 6.5 | 69.3 | 191 | 203 | 215 | 6 | 7 | 0 | | | | | | | |
| 32 FT | 25 | 28 | 19 | 8 | 6 | 7 | 6 | 73.6 | 49.6 | 52.5 | 55.3 | 8 | 6 | 7 | 7 | 69.6 | 192 | 204 | 216 | 6 | 6.5 | 0 | | | | | | | |
| 34 FT | 26 | 29 | 20 | 8 | 6 | 7 | 6 | 74.0 | 52.4 | 55.3 | 58.1 | 9 | 7.5 | 7 | 7 | 68.0 | 193 | 205 | 217 | 6 | 6.5 | 0 | | | | | | | |
| 36 FT | 27 | 30 | 21 | 9 | 7.5 | 7 | 6 | 74.4 | 52.8 | 55.6 | 58.5 | 9 | 7 | 7 | 7.5 | 68.4 | 194 | 206 | 218 | 6 | 6.5 | 0 | | | | | | | |
| 38 FT | 28 | 31 | 21 | 9 | 7 | 7 | 6 | 74.4 | 55.5 | 58.5 | 61.5 | 9 | 7 | 7 | 7 | 68.4 | 195 | 207 | 219 | 6 | 6 | 0 | | | | | | | |
| 40 FT | 29 | 32 | 22 | 9 | 7 | 7 | 6 | 74.8 | 60.5 | 63.8 | 67.0 | 9 | 7 | 7 | 7 | 68.6 | 196 | 208 | 220 | 6 | 6 | 0 | | | | | | | |
| 42 FT | 30 | 33 | 23 | 9 | 7 | 7 | 6 | 77.1 | 61.0 | 64.3 | 67.5 | 9 | 7 | 7 | 7 | 69.0 | 197 | 209 | 221 | 6 | 6 | 0 | | | | | | | |
| 44 FT | 31 | 34 | 24 | 9 | 6.5 | 7 | 6 | 77.5 | 61.5 | 64.8 | 68.0 | 9 | 6.5 | 7 | 7 | 69.4 | 198 | 210 | 222 | 6 | 6 | 0 | | | | | | | |
| 46 FT | 32 | 35 | 24 | 9 | 6.5 | 7 | 6 | 77.5 | 62.1 | 65.4 | 68.6 | 9 | 6.5 | 7 | 7 | 69.4 | 199 | 211 | 223 | 7 | 8 | 0 | | | | | | | |
| 48 FT | 33 | 36 | 25 | 9 | 6.5 | 7 | 6 | 77.9 | 65.0 | 68.4 | 71.6 | 9 | 6.5 | 7 | 7 | 69.8 | 200 | 212 | 224 | 7 | 8 | 0 | | | | | | | |
| 50 FT | 34 | 37 | 25 | 9 | 6.5 | 7 | 6 | 77.9 | 65.5 | 68.9 | 72.3 | 9 | 6.5 | 7 | 7 | 71.8 | 201 | 213 | 225 | 7 | 7.5 | 0 | | | | | | | |



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT CL CULVERT.



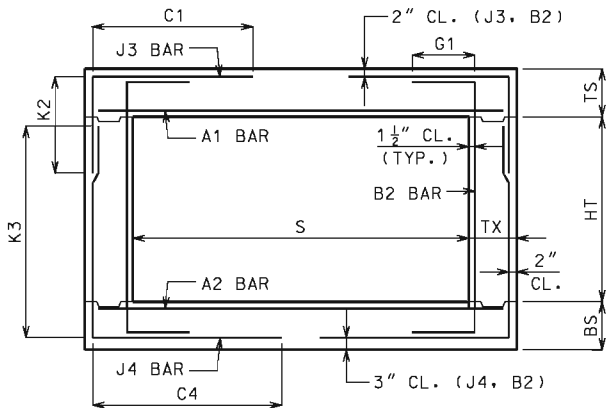
ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

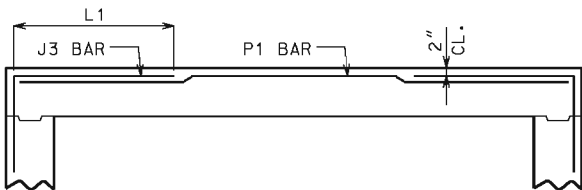
| SPAN (S) = 15 FT | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|------|---------|-------|--------|--------|--------|------|------------------|------|---------------------------------------|---------|--------|--------|--------|------|------|-----------|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | | | |
| | | | | A1 BARS | | | J3 BARS | | | | | | A2 BARS | | | J4 BARS | | | | | | B2 BARS | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | |
| 1 FT | 12 | 12 | 9 | 7 | 7 | 6 | 6.5 | 109.6 | 36.3 | 39.1 | 42.0 | 7 | 7 | 6 | 6 | 109.6 | 140 | 152 | 164 | 5 | 8.5 | 12 | | | | | | | |
| 2 FT | 13 | 14 | 9 | 7 | 7 | 6 | 6.5 | 109.6 | 38.5 | 41.5 | 44.5 | 7 | 7.5 | 6 | 6 | 109.6 | 142 | 154 | 166 | 5 | 8.5 | 12 | | | | | | | |
| 4 FT | 11 | 12 | 10 | 7 | 6.5 | 6 | 6 | 74.1 | 36.0 | 38.9 | 41.8 | 7 | 7 | 6 | 6 | 76.0 | 140 | 152 | 164 | 5 | 8 | 0 | | | | | | | |
| 6 FT | 12 | 13 | 10 | 7 | 7 | 6 | 6.5 | 64.6 | 36.5 | 39.4 | 42.3 | 7 | 6.5 | 6 | 6.5 | 68.4 | 141 | 153 | 165 | 5 | 8 | 0 | | | | | | | |
| 8 FT | 12 | 13 | 10 | 7 | 6.5 | 6 | 6 | 58.9 | 36.5 | 39.4 | 42.3 | 7 | 6 | 6 | 6 | 62.8 | 141 | 153 | 165 | 5 | 8 | 0 | | | | | | | |
| 10 FT | 13 | 14 | 10 | 7 | 6 | 7 | 7 | 58.9 | 38.5 | 41.5 | 44.5 | 8 | 7 | 6 | 6 | 58.9 | 142 | 154 | 166 | 5 | 8 | 0 | | | | | | | |
| 12 FT | 13 | 15 | 10 | 8 | 7 | 7 | 6 | 57.0 | 38.8 | 41.8 | 44.8 | 8 | 6.5 | 7 | 6.5 | 58.9 | 143 | 155 | 167 | 5 | 8 | 0 | | | | | | | |
| 14 FT | 14 | 17 | 11 | 8 | 7 | 7 | 6.5 | 57.3 | 39.5 | 42.5 | 45.5 | 8 | 6.5 | 6 | 6 | 53.5 | 145 | 157 | 169 | 5 | 7.5 | 0 | | | | | | | |
| 16 FT | 14 | 17 | 11 | 8 | 6.5 | 7 | 6 | 53.5 | 39.5 | 42.5 | 45.5 | 8 | 6.5 | 6 | 6 | 49.6 | 145 | 157 | 169 | 5 | 8.5 | 0 | | | | | | | |
| 18 FT | 16 | 19 | 12 | 8 | 6.5 | 7 | 7 | 61.5 | 40.5 | 43.5 | 46.5 | 8 | 6.5 | 6 | 6.5 | 49.9 | 147 | 159 | 171 | 5 | 8.5 | 0 | | | | | | | |
| 20 FT | 17 | 20 | 12 | 8 | 6 | 7 | 6 | 61.5 | 41.0 | 44.0 | 47.0 | 8 | 6.5 | 6 | 6 | 49.9 | 148 | 160 | 172 | 5 | 7.5 | 0 | | | | | | | |
| 22 FT | 19 | 22 | 13 | 8 | 6.5 | 7 | 7 | 61.8 | 43.6 | 46.8 | 49.9 | 8 | 6.5 | 6 | 6.5 | 50.1 | 150 | 162 | 174 | 5 | 7.5 | 0 | | | | | | | |
| 24 FT | 20 | 23 | 13 | 8 | 6 | 7 | 6.5 | 59.9 | 44.3 | 47.4 | 50.5 | 8 | 6 | 6 | 6 | 50.1 | 151 | 163 | 175 | 5 | 6.5 | 0 | | | | | | | |
| 26 FT | 21 | 24 | 14 | 8 | 6 | 7 | 6 | 62.1 | 46.5 | 49.6 | 52.9 | 8 | 6 | 6 | 6.5 | 50.5 | 152 | 164 | 176 | 5 | 7 | 0 | | | | | | | |
| 28 FT | 23 | 25 | 14 | 8 | 6 | 7 | 7 | 60.1 | 47.3 | 50.5 | 53.8 | 8 | 6 | 6 | 6 | 50.5 | 153 | 165 | 177 | 5 | 6 | 0 | | | | | | | |
| 30 FT | 24 | 27 | 15 | 9 | 7.5 | 7 | 7 | 60.5 | 48.0 | 51.3 | 54.5 | 8 | 6 | 6 | 6.5 | 50.8 | 155 | 167 | 179 | 5 | 6 | 0 | | | | | | | |
| 32 FT | 25 | 28 | 15 | 9 | 7 | 7 | 6.5 | 60.5 | 50.4 | 53.8 | 57.1 | 8 | 6 | 6 | 6 | 50.8 | 156 | 168 | 180 | 6 | 8 | 0 | | | | | | | |
| 34 FT | 26 | 29 | 15 | 9 | 7 | 7 | 6 | 60.5 | 51.0 | 54.4 | 57.6 | 9 | 7.5 | 6 | 6 | 50.8 | 157 | 169 | 181 | 6 | 8 | 0 | | | | | | | |
| 36 FT | 27 | 30 | 16 | 9 | 7 | 7 | 6 | 60.8 | 51.5 | 54.9 | 58.3 | 9 | 7 | 6 | 6 | 51.0 | 158 | 170 | 182 | 6 | 8 | 0 | | | | | | | |
| 38 FT | 28 | 31 | 16 | 9 | 6.5 | 7 | 6 | 60.8 | 52.1 | 55.5 | 58.8 | 9 | 7 | 6 | 6 | 51.0 | 159 | 171 | 183 | 6 | 8 | 0 | | | | | | | |
| 40 FT | 29 | 32 | 17 | 9 | 6.5 | 7 | 6 | 61.1 | 54.5 | 58.0 | 61.5 | 9 | 7 | 6 | 6 | 51.3 | 160 | 172 | 184 | 6 | 7.5 | 0 | | | | | | | |
| 42 FT | 31 | 33 | 17 | 9 | 6.5 | 7 | 7 | 61.1 | 55.4 | 58.9 | 62.4 | 9 | 7 | 6 | 6 | 51.3 | 161 | 173 | 185 | 6 | 7.5 | 0 | | | | | | | |
| 44 FT | 32 | 34 | 17 | 9 | 6.5 | 7 | 6.5 | 61.1 | 57.9 | 61.5 | 65.1 | 9 | 6.5 | 6 | 6 | 51.3 | 162 | 174 | 186 | 6 | 7.5 | 0 | | | | | | | |
| 46 FT | 33 | 35 | 17 | 9 | 6 | 7 | 6 | 61.1 | 58.5 | 62.1 | 65.8 | 9 | 6.5 | 6 | 6 | 53.3 | 163 | 175 | 187 | 6 | 7.5 | 0 | | | | | | | |
| 48 FT | 34 | 36 | 18 | 9 | 6 | 7 | 7 | 61.4 | 59.1 | 62.8 | 66.3 | 9 | 6.5 | 6 | 6 | 53.5 | 164 | 176 | 188 | 6 | 7 | 0 | | | | | | | |
| 50 FT | 34 | 37 | 18 | 9 | 6 | 7 | 6 | 61.4 | 59.4 | 63.0 | 66.6 | 9 | 6.5 | 6 | 6 | 53.5 | 165 | 177 | 189 | 6 | 7 | 0 | | | | | | | |

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | |
|------------------|------------------|----|----|---------------|------|---------|------|-------|-------|-------|--------|---------|------|------------------|------|------|-------|-------|--------|---------|------|-------------------------------------|--|-----------|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | | A2 BARS | | J4 BARS | | | | | | B2 BARS | | | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | | | | | |
| | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | |
| 1 FT | 12 | 13 | 8 | 7 | 6.5 | 6 | 6.5 | 116.0 | 37.1 | 41.0 | 44.8 | 7 | 7.5 | 6 | 6.5 | 76.0 | 105 | 117 | 129 | 5 | 12 | 12 | | | | | | | | | |
| 2 FT | 12 | 13 | 8 | 7 | 6 | 6 | 6 | 116.0 | 37.1 | 41.0 | 44.8 | 7 | 7 | 6 | 6 | 64.0 | 105 | 117 | 129 | 5 | 12 | 12 | | | | | | | | | |
| 4 FT | 12 | 12 | 9 | 7 | 6.5 | 6 | 6.5 | 54.3 | 36.8 | 40.6 | 44.5 | 7 | 6.5 | 6 | 6 | 54.3 | 104 | 116 | 128 | 5 | 12 | 0 | | | | | | | | | |
| 6 FT | 12 | 12 | 9 | 7 | 6 | 6 | 6.5 | 50.3 | 36.8 | 40.6 | 44.5 | 7 | 6 | 6 | 6 | 50.3 | 104 | 116 | 128 | 5 | 12 | 0 | | | | | | | | | |
| 8 FT | 12 | 13 | 9 | 8 | 7.5 | 7 | 6.5 | 50.3 | 37.1 | 41.0 | 44.8 | 8 | 7 | 6 | 6 | 46.3 | 105 | 117 | 129 | 5 | 12 | 0 | | | | | | | | | |
| 10 FT | 13 | 14 | 9 | 8 | 6.5 | 7 | 6.5 | 48.3 | 37.8 | 41.6 | 45.5 | 8 | 6.5 | 6 | 6 | 44.3 | 106 | 118 | 130 | 5 | 12 | 0 | | | | | | | | | |
| 12 FT | 14 | 16 | 9 | 8 | 6.5 | 7 | 6.5 | 46.3 | 35.1 | 38.6 | 42.0 | 8 | 6.5 | 6 | 7.5 | 40.3 | 108 | 120 | 132 | 5 | 12 | 0 | | | | | | | | | |
| 14 FT | 15 | 18 | 9 | 8 | 6 | 7 | 6 | 52.3 | 36.0 | 39.5 | 42.9 | 8 | 6 | 6 | 8 | 38.3 | 110 | 122 | 134 | 5 | 12 | 0 | | | | | | | | | |
| 16 FT | 16 | 19 | 9 | 9 | 7 | 7 | 6 | 50.3 | 36.5 | 40.0 | 43.5 | 8 | 6 | 6 | 7.5 | 38.3 | 111 | 123 | 135 | 5 | 12 | 0 | | | | | | | | | |
| 18 FT | 17 | 20 | 9 | 9 | 7 | 7 | 6.5 | 50.3 | 37.1 | 40.6 | 44.1 | 8 | 6 | 6 | 8 | 38.3 | 112 | 124 | 136 | 5 | 12 | 0 | | | | | | | | | |
| 20 FT | 19 | 21 | 9 | 9 | 7 | 7 | 7 | 50.3 | 39.3 | 42.9 | 46.5 | 8 | 6 | 6 | 7.5 | 38.3 | 113 | 125 | 137 | 5 | 10.5 | 0 | | | | | | | | | |
| 22 FT | 20 | 23 | 9 | 9 | 6.5 | 7 | 6.5 | 50.3 | 40.3 | 43.8 | 47.4 | 8 | 6 | 6 | 7.5 | 38.3 | 115 | 127 | 139 | 5 | 9 | 0 | | | | | | | | | |
| 24 FT | 22 | 24 | 10 | 9 | 7 | 7 | 7.5 | 50.5 | 42.5 | 46.3 | 49.9 | 9 | 7.5 | 6 | 7.5 | 38.4 | 116 | 128 | 140 | 5 | 9.5 | 0 | | | | | | | | | |
| 26 FT | 23 | 25 | 10 | 9 | 6.5 | 7 | 7 | 50.5 | 47.3 | 51.4 | 55.4 | 9 | 7 | 6 | 7 | 38.4 | 117 | 129 | 141 | 5 | 8.5 | 0 | | | | | | | | | |
| 28 FT | 25 | 27 | 11 | 9 | 6.5 | 6 | 6 | 46.8 | 45.8 | 49.6 | 53.5 | 9 | 7 | 6 | 8 | 40.6 | 119 | 131 | 143 | 5 | 8.5 | 0 | | | | | | | | | |
| 30 FT | 26 | 28 | 11 | 9 | 6.5 | 6 | 6 | 46.8 | 46.4 | 50.3 | 54.1 | 9 | 7 | 6 | 8 | 40.6 | 120 | 132 | 144 | 5 | 7.5 | 0 | | | | | | | | | |
| 32 FT | 28 | 29 | 11 | 9 | 6.5 | 6 | 6.5 | 46.8 | 53.3 | 57.6 | 61.9 | 9 | 7 | 6 | 7 | 40.6 | 121 | 133 | 145 | 5 | 7.5 | 0 | | | | | | | | | |
| 34 FT | 29 | 31 | 12 | 9 | 6.5 | 6 | 6.5 | 46.9 | 54.4 | 58.6 | 63.0 | 9 | 7 | 6 | 7.5 | 40.8 | 123 | 135 | 147 | 5 | 7 | 0 | | | | | | | | | |
| 36 FT | 30 | 32 | 12 | 9 | 6 | 6 | 6.5 | 46.9 | 55.1 | 59.4 | 63.8 | 9 | 6.5 | 6 | 7.5 | 40.8 | 124 | 136 | 148 | 5 | 7 | 0 | | | | | | | | | |
| 38 FT | 31 | 33 | 12 | 9 | 6 | 6 | 6.5 | 46.9 | 55.8 | 60.1 | 64.5 | 9 | 6.5 | 6 | 7 | 40.8 | 125 | 137 | 149 | 5 | 7 | 0 | | | | | | | | | |
| 40 FT | 32 | 34 | 12 | 9 | 6 | 6 | 6.5 | 46.9 | 56.5 | 60.9 | 65.1 | 9 | 6.5 | 6 | 7 | 40.8 | 126 | 138 | 150 | 5 | 7 | 0 | | | | | | | | | |
| 42 FT | 33 | 35 | 12 | 9 | 6 | 6 | 6 | 46.9 | 57.3 | 61.5 | 65.9 | 9 | 6.5 | 6 | 6.5 | 40.8 | 127 | 139 | 151 | 5 | 6.5 | 0 | | | | | | | | | |
| 44 FT | 34 | 36 | 13 | 10 | 7.5 | 6 | 6.5 | 47.1 | 59.6 | 64.0 | 68.5 | 9 | 6 | 6 | 6.5 | 41.0 | 128 | 140 | 152 | 5 | 6.5 | 0 | | | | | | | | | |
| 46 FT | 35 | 37 | 13 | 10 | 7 | 6 | 6 | 47.1 | 60.3 | 64.8 | 69.3 | 9 | 6 | 6 | 6.5 | 41.0 | 129 | 141 | 153 | 5 | 6.5 | 0 | | | | | | | | | |
| 48 FT | 36 | 38 | 13 | 10 | 7 | 6 | 6.5 | 47.1 | 61.0 | 65.5 | 69.9 | 9 | 6 | 6 | 6 | 41.0 | 130 | 142 | 154 | 5 | 6 | 0 | | | | | | | | | |
| 50 FT | 37 | 39 | 13 | 10 | 7 | 6 | 6 | 47.1 | 61.8 | 66.3 | 70.6 | 9 | 6 | 6 | 6 | 41.0 | 131 | 143 | 155 | 6 | 8.5 | 0 | | | | | | | | | |

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|-------|--------|--------|---------|------|------------------|------|------|---------------------------------------|--------|---------|--------|------|------|-----------|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | |
| | | | | | | | | | HT=14' | HT=15' | HT=16' | | | | | | HT=14' | HT=15' | HT=16' | | | | | | |
| 1 FT | 13 | 14 | 11 | 7 | 7.5 | 6 | 7 | 117.8 | 38.0 | 40.4 | 42.8 | 7 | 7.5 | 6 | 6.5 | 117.8 | 178 | 190 | 202 | 5 | 7.5 | 12 | | | |
| 2 FT | 13 | 14 | 11 | 7 | 7 | 7 | 7.5 | 121.8 | 38.0 | 40.4 | 42.8 | 7 | 7 | 6 | 6.5 | 117.8 | 178 | 190 | 202 | 5 | 7 | 12 | | | |
| 4 FT | 12 | 14 | 11 | 7 | 6.5 | 6 | 6 | 117.8 | 37.8 | 40.3 | 42.6 | 7 | 6.5 | 6 | 6 | 117.8 | 178 | 190 | 202 | 5 | 6.5 | 0 | | | |
| 6 FT | 12 | 14 | 12 | 7 | 6.5 | 6 | 6 | 83.6 | 37.8 | 40.3 | 42.6 | 7 | 6.5 | 6 | 6 | 95.9 | 178 | 190 | 202 | 5 | 7 | 0 | | | |
| 8 FT | 12 | 14 | 13 | 7 | 6.5 | 7 | 6.5 | 77.9 | 37.8 | 40.3 | 42.6 | 7 | 6 | 6 | 6 | 80.0 | 178 | 190 | 202 | 5 | 6.5 | 0 | | | |
| 10 FT | 13 | 16 | 13 | 7 | 6 | 7 | 6.5 | 75.9 | 38.4 | 40.8 | 43.3 | 8 | 7.5 | 6 | 6 | 77.9 | 180 | 192 | 204 | 5 | 6.5 | 0 | | | |
| 12 FT | 14 | 17 | 14 | 7 | 6 | 7 | 6.5 | 72.1 | 40.8 | 43.3 | 45.8 | 8 | 7 | 7 | 8 | 76.3 | 181 | 193 | 205 | 5 | 6 | 0 | | | |
| 14 FT | 16 | 18 | 14 | 8 | 7 | 7 | 6.5 | 78.3 | 45.3 | 48.1 | 50.9 | 8 | 6.5 | 7 | 7 | 74.1 | 182 | 194 | 206 | 5 | 6 | 0 | | | |
| 16 FT | 17 | 19 | 15 | 8 | 7 | 7 | 6.5 | 78.6 | 47.8 | 50.6 | 53.5 | 8 | 6.5 | 7 | 6.5 | 72.5 | 183 | 195 | 207 | 6 | 8 | 0 | | | |
| 18 FT | 17 | 20 | 15 | 8 | 6.5 | 7 | 6.5 | 72.5 | 42.0 | 44.5 | 47.0 | 8 | 6 | 7 | 7.5 | 66.3 | 184 | 196 | 208 | 6 | 8 | 0 | | | |
| 20 FT | 19 | 21 | 15 | 8 | 6.5 | 7 | 6 | 72.5 | 50.8 | 53.8 | 56.8 | 8 | 6 | 7 | 6.5 | 66.3 | 185 | 197 | 209 | 6 | 8 | 0 | | | |
| 22 FT | 20 | 23 | 16 | 8 | 6 | 7 | 6 | 72.8 | 45.4 | 48.0 | 50.6 | 8 | 6 | 7 | 7 | 66.5 | 187 | 199 | 211 | 6 | 8 | 0 | | | |
| 24 FT | 22 | 24 | 16 | 8 | 6 | 7 | 6 | 72.8 | 52.3 | 55.3 | 58.3 | 9 | 7.5 | 7 | 6.5 | 66.5 | 188 | 200 | 212 | 6 | 8 | 0 | | | |
| 26 FT | 23 | 26 | 17 | 8 | 6 | 7 | 6 | 73.1 | 50.9 | 53.8 | 56.6 | 9 | 7.5 | 7 | 7 | 66.9 | 190 | 202 | 214 | 6 | 7.5 | 0 | | | |
| 28 FT | 24 | 27 | 18 | 9 | 7 | 7 | 6 | 73.5 | 51.4 | 54.3 | 57.1 | 9 | 7 | 7 | 7 | 67.3 | 191 | 203 | 215 | 6 | 7 | 0 | | | |
| 30 FT | 26 | 28 | 18 | 9 | 7 | 7 | 6 | 73.5 | 56.4 | 59.5 | 62.6 | 9 | 7 | 7 | 6.5 | 67.3 | 192 | 204 | 216 | 6 | 7 | 0 | | | |
| 32 FT | 27 | 30 | 19 | 9 | 7 | 7 | 6 | 73.9 | 55.0 | 58.0 | 61.0 | 9 | 7 | 7 | 7 | 67.5 | 194 | 206 | 218 | 6 | 6.5 | 0 | | | |
| 34 FT | 28 | 31 | 20 | 9 | 7 | 7 | 6 | 74.3 | 55.5 | 58.5 | 61.5 | 9 | 7 | 7 | 7 | 67.9 | 195 | 207 | 219 | 6 | 6.5 | 0 | | | |
| 36 FT | 29 | 32 | 21 | 9 | 6.5 | 7 | 6 | 74.5 | 53.8 | 56.6 | 59.5 | 9 | 6.5 | 7 | 7 | 68.1 | 196 | 208 | 220 | 6 | 6.5 | 0 | | | |
| 38 FT | 30 | 33 | 22 | 9 | 6.5 | 7 | 6 | 74.9 | 61.0 | 64.3 | 67.5 | 9 | 6.5 | 7 | 7 | 68.5 | 197 | 209 | 221 | 6 | 6.5 | 0 | | | |
| 40 FT | 31 | 34 | 22 | 9 | 6.5 | 7 | 6 | 74.9 | 61.5 | 64.8 | 68.0 | 9 | 6.5 | 7 | 7 | 68.5 | 198 | 210 | 222 | 6 | 6 | 0 | | | |
| 42 FT | 32 | 35 | 23 | 9 | 6.5 | 7 | 6 | 75.3 | 62.1 | 65.4 | 68.6 | 9 | 6.5 | 7 | 7 | 68.8 | 199 | 211 | 223 | 6 | 6 | 0 | | | |
| 44 FT | 34 | 36 | 23 | 9 | 6 | 7 | 6 | 75.3 | 65.3 | 68.6 | 72.0 | 9 | 6 | 7 | 6.5 | 68.8 | 200 | 212 | 224 | 7 | 8 | 0 | | | |
| 46 FT | 35 | 37 | 24 | 9 | 6 | 7 | 6 | 75.6 | 65.8 | 69.1 | 72.5 | 9 | 6 | 7 | 6.5 | 69.1 | 201 | 213 | 225 | 6 | 6 | 0 | | | |
| 48 FT | 36 | 38 | 24 | 9 | 6 | 7 | 6 | 75.6 | 66.4 | 69.8 | 73.1 | 9 | 6 | 7 | 7 | 69.1 | 202 | 214 | 226 | 7 | 7.5 | 0 | | | |
| 50 FT | 37 | 39 | 25 | 9 | 6 | 7 | 6 | 76.0 | 69.3 | 72.8 | 76.3 | 9 | 6 | 7 | 7 | 69.5 | 203 | 215 | 227 | 7 | 7.5 | 0 | | | |



BAR DIMENSIONS DIAGRAM
SYMMETRICAL ABOUT CL CULVERT.



ALTERNATE J3 BAR

AT CONTRACTOR'S OPTION, ALTERNATE J3 BARS MAY BE USED WHEN THE DISTANCE BETWEEN THE ENDS OF J3 BARS IN THE TOP SLAB IS LESS THAN 2'-0". DIMENSION L1 (NOT C1) SHALL BE USED WITH ALTERNATE J3 BARS, WHERE L1 IS EQUAL TO 18", 22" AND 28" FOR #4, #5 AND #6 BARS, RESPECTIVELY. ADDITIONAL P1 BARS ARE REQUIRED WITH ALTERNATE J3 BARS WITH A LENGTH EQUAL TO A1 BARS, AND SIZE AND SPACING EQUAL TO J3 BARS. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS SUBSTITUTION.

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | |
|------------------|---------------------|----|----|---------------|------|---------|------|-------|--------|--------|---------|------|------------------|------|------|---------------------------------------|--------|---------|--------|------|------|-----------|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | TOP SLAB BARS | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | WALL BARS | | | | | |
| | | | | A1 BARS | | J3 BARS | | | | | A2 BARS | | J4 BARS | | | | | B2 BARS | | | | | | | | | |
| | TS | BS | TX | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | G1 | | | | | |
| | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | |
| 1 FT | 12 | 14 | 9 | 7 | 6.5 | 6 | 6 | 116.6 | 36.8 | 39.6 | 42.5 | 7 | 7.5 | 6 | 6 | 116.6 | 142 | 154 | 166 | 5 | 8.5 | 12 | | | | | |
| 2 FT | 13 | 14 | 10 | 7 | 7 | 6 | 7 | 117.1 | 38.5 | 41.5 | 44.5 | 7 | 7.5 | 6 | 6 | 101.0 | 142 | 154 | 166 | 5 | 8.5 | 12 | | | | | |
| 4 FT | 12 | 13 | 10 | 7 | 6.5 | 6 | 6.5 | 72.8 | 36.5 | 39.4 | 42.3 | 7 | 6.5 | 6 | 6.5 | 74.8 | 141 | 153 | 165 | 5 | 8.5 | 0 | | | | | |
| 6 FT | 12 | 13 | 10 | 7 | 6 | 6 | 6 | 62.6 | 36.5 | 39.4 | 42.3 | 7 | 6 | 6 | 6 | 64.6 | 141 | 153 | 165 | 5 | 8.5 | 0 | | | | | |
| 8 FT | 12 | 14 | 10 | 7 | 6 | 7 | 6 | 62.6 | 36.8 | 39.6 | 42.5 | 8 | 7.5 | 6 | 6 | 60.6 | 142 | 154 | 166 | 5 | 8.5 | 0 | | | | | |
| 10 FT | 13 | 15 | 11 | 8 | 7.5 | 7 | 6.5 | 60.9 | 37.3 | 40.1 | 43.0 | 8 | 7 | 6 | 6.5 | 56.9 | 143 | 155 | 167 | 5 | 9 | 0 | | | | | |
| 12 FT | 14 | 16 | 11 | 8 | 6.5 | 7 | 6.5 | 58.9 | 39.3 | 42.3 | 45.3 | 8 | 6.5 | 6 | 6 | 54.8 | 144 | 156 | 168 | 5 | 8.5 | 0 | | | | | |
| 14 FT | 15 | 17 | 11 | 8 | 6 | 7 | 6 | 65.0 | 46.1 | 49.6 | 53.1 | 8 | 6 | 7 | 7 | 56.9 | 145 | 157 | 169 | 5 | 8 | 0 | | | | | |
| 16 FT | 16 | 19 | 12 | 8 | 6 | 7 | 6 | 65.3 | 40.5 | 43.5 | 46.5 | 8 | 6 | 6 | 6 | 53.0 | 147 | 159 | 171 | 5 | 8 | 0 | | | | | |
| 18 FT | 17 | 20 | 12 | 8 | 6 | 7 | 6.5 | 61.3 | 41.0 | 44.0 | 47.0 | 8 | 6 | 6 | 6.5 | 49.0 | 148 | 160 | 172 | 5 | 9 | 0 | | | | | |
| 20 FT | 19 | 21 | 12 | 8 | 6 | 7 | 6.5 | 59.1 | 43.4 | 46.5 | 49.6 | 8 | 6 | 6 | 6 | 49.0 | 149 | 161 | 173 | 5 | 7.5 | 0 | | | | | |
| 22 FT | 20 | 23 | 13 | 9 | 7.5 | 7 | 6.5 | 61.5 | 44.3 | 47.4 | 50.5 | 8 | 6 | 6 | 6.5 | 49.3 | 151 | 163 | 175 | 5 | 8 | 0 | | | | | |
| 24 FT | 22 | 24 | 13 | 9 | 7 | 7 | 6.5 | 59.5 | 46.8 | 50.0 | 53.3 | 9 | 7.5 | 6 | 6 | 49.3 | 152 | 164 | 176 | 5 | 6.5 | 0 | | | | | |
| 26 FT | 23 | 26 | 14 | 9 | 7 | 7 | 6.5 | 59.8 | 47.5 | 50.8 | 54.0 | 9 | 7.5 | 6 | 6.5 | 49.5 | 154 | 166 | 178 | 5 | 7 | 0 | | | | | |
| 28 FT | 24 | 27 | 14 | 9 | 7 | 7 | 6.5 | 59.8 | 48.0 | 51.3 | 54.5 | 9 | 7 | 6 | 6 | 49.5 | 155 | 167 | 179 | 5 | 6 | 0 | | | | | |
| 30 FT | 26 | 28 | 14 | 9 | 6.5 | 7 | 6 | 59.8 | 50.6 | 54.0 | 57.4 | 9 | 7 | 6 | 6 | 49.5 | 156 | 168 | 180 | 5 | 6 | 0 | | | | | |
| 32 FT | 27 | 29 | 15 | 9 | 6.5 | 7 | 6.5 | 60.0 | 51.3 | 54.6 | 58.0 | 9 | 7 | 6 | 6 | 49.6 | 157 | 169 | 181 | 5 | 6 | 0 | | | | | |
| 34 FT | 28 | 31 | 15 | 9 | 6.5 | 7 | 6 | 60.0 | 52.1 | 55.5 | 58.8 | 9 | 7 | 6 | 6 | 49.6 | 159 | 171 | 183 | 6 | 8 | 0 | | | | | |
| 36 FT | 29 | 32 | 16 | 9 | 6.5 | 7 | 6.5 | 60.4 | 54.5 | 58.0 | 61.5 | 9 | 6.5 | 6 | 6 | 49.9 | 160 | 172 | 184 | 6 | 8 | 0 | | | | | |
| 38 FT | 30 | 33 | 16 | 9 | 6 | 7 | 6 | 60.4 | 55.1 | 58.6 | 62.0 | 9 | 6.5 | 6 | 6 | 49.9 | 161 | 173 | 185 | 6 | 8 | 0 | | | | | |
| 40 FT | 32 | 34 | 16 | 9 | 6 | 7 | 6.5 | 60.4 | 57.9 | 61.5 | 65.1 | 9 | 6.5 | 6 | 6 | 49.9 | 162 | 174 | 186 | 6 | 8 | 0 | | | | | |
| 42 FT | 33 | 35 | 17 | 9 | 6 | 7 | 7 | 60.6 | 58.5 | 62.1 | 65.8 | 9 | 6.5 | 6 | 6 | 50.1 | 163 | 175 | 187 | 6 | 7.5 | 0 | | | | | |
| 44 FT | 34 | 36 | 17 | 9 | 6 | 7 | 7 | 60.6 | 59.1 | 62.8 | 66.3 | 9 | 6 | 6 | 6 | 50.1 | 164 | 176 | 188 | 6 | 7.5 | 0 | | | | | |
| 46 FT | 35 | 37 | 17 | 10 | 7.5 | 7 | 6.5 | 60.6 | 59.8 | 63.3 | 66.9 | 9 | 6 | 6 | 6 | 50.1 | 165 | 177 | 189 | 6 | 7.5 | 0 | | | | | |
| 48 FT | 36 | 38 | 18 | 10 | 7 | 7 | 7 | 60.9 | 60.3 | 63.9 | 67.5 | 9 | 6 | 6 | 6 | 52.5 | 166 | 178 | 190 | 6 | 7 | 0 | | | | | |
| 50 FT | 37 | 39 | 18 | 10 | 7 | 7 | 7 | 60.9 | 62.9 | 66.6 | 70.4 | 9 | 6 | 6 | 6 | 52.5 | 167 | 179 | 191 | 6 | 7 | 0 | | | | | |

| AREA OF STEEL REQUIRED FOR J5 BARS IN WINGS (SQ. IN./FT.) WALL HEIGHT VS. WALL THICKNESS | | | | | | | | | | | | | | | | |
|---|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ⓢ Backfill Slope = 2:1 | | | | | | | | | | | | | | | | |
| Wall Thickness TX (in.) | Wall Height (ft.) | | | | | | | | | | | | | | | |
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 8 | 0.168 | 0.168 | 0.197 | 0.291 | 0.414 | 0.429 | 0.578 | 0.766 | 1.003 | | | | | | | |
| 9 | 0.168 | 0.168 | 0.168 | 0.244 | 0.346 | 0.456 | 0.477 | 0.626 | 0.809 | 1.034 | 1.312 | | | | | |
| 10 | 0.168 | 0.168 | 0.168 | 0.211 | 0.298 | 0.407 | 0.487 | 0.532 | 0.683 | 0.864 | 1.084 | 1.349 | | | | |
| 11 | 0.168 | 0.168 | 0.168 | 0.185 | 0.261 | 0.357 | 0.417 | 0.520 | 0.592 | 0.746 | 0.929 | 1.147 | 1.405 | | | |
| 12 | | 0.168 | 0.168 | 0.168 | 0.233 | 0.318 | 0.422 | 0.548 | 0.554 | 0.658 | 0.816 | 1.002 | 1.220 | 1.475 | | |
| 13 | | 0.168 | 0.168 | 0.168 | 0.210 | 0.287 | 0.380 | 0.493 | 0.588 | 0.589 | 0.729 | 0.892 | 1.081 | 1.301 | | |
| 14 | | | 0.168 | 0.168 | 0.192 | 0.261 | 0.346 | 0.448 | 0.569 | 0.623 | 0.659 | 0.805 | 0.973 | 1.167 | 1.390 | |
| 15 | | | | 0.168 | 0.176 | 0.240 | 0.317 | 0.411 | 0.521 | 0.652 | 0.658 | 0.734 | 0.886 | 1.059 | 1.258 | |
| 16 | | | | | 0.168 | 0.222 | 0.293 | 0.379 | 0.481 | 0.601 | 0.693 | 0.693 | 0.813 | 0.971 | 1.151 | |
| 17 | | | | | 0.168 | 0.206 | 0.273 | 0.352 | 0.447 | 0.557 | 0.686 | 0.729 | 0.752 | 0.897 | 1.061 | 1.247 |
| 18 | | | | | | | 0.255 | 0.329 | 0.417 | 0.520 | 0.639 | 0.764 | 0.764 | 0.834 | 0.985 | 1.156 |
| 19 | | | | | | | | 0.309 | 0.391 | 0.487 | 0.599 | 0.727 | 0.800 | 0.800 | 0.920 | 1.078 |
| 20 | | | | | | | | 0.291 | 0.368 | 0.459 | 0.563 | 0.684 | 0.821 | 0.836 | 0.863 | 1.011 |
| 21 | | | | | | | | | 0.348 | 0.433 | 0.532 | 0.645 | 0.774 | 0.871 | 0.871 | 0.952 |
| 22 | | | | | | | | | 0.411 | 0.504 | 0.611 | 0.733 | 0.870 | 0.907 | 0.907 | 0.970 |
| 23 | | | | | | | | | | | 0.479 | 0.580 | 0.696 | 0.826 | 0.943 | 0.943 |
| 24 | | | | | | | | | | | 0.456 | 0.552 | 0.662 | 0.786 | 0.925 | 0.979 |
| 25 | | | | | | | | | | | | 0.527 | 0.632 | 0.750 | 0.882 | 1.015 |
| 26 | | | | | | | | | | | | | 0.604 | 0.717 | 0.843 | 0.984 |
| 27 | | | | | | | | | | | | | | 0.686 | 0.807 | 0.942 |

| AREA OF STEEL REQUIRED FOR J5 BARS IN WINGS (SQ. IN./FT.) WALL HEIGHT VS. WALL THICKNESS | | | | | | | | | | | | | | | | |
|---|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ⓢ Backfill Slope = 3:1 | | | | | | | | | | | | | | | | |
| Wall Thickness TX (in.) | Wall Height (ft.) | | | | | | | | | | | | | | | |
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 8 | 0.168 | 0.168 | 0.168 | 0.187 | 0.264 | 0.362 | 0.425 | 0.475 | 0.612 | | | | | | | |
| 9 | 0.168 | 0.168 | 0.168 | 0.168 | 0.222 | 0.303 | 0.403 | 0.456 | 0.504 | 0.637 | 0.795 | | | | | |
| 10 | 0.168 | 0.168 | 0.168 | 0.168 | 0.191 | 0.261 | 0.346 | 0.450 | 0.487 | 0.541 | 0.671 | 0.824 | 1.005 | 1.217 | | |
| 11 | 0.168 | 0.168 | 0.168 | 0.168 | 0.168 | 0.229 | 0.304 | 0.394 | 0.501 | 0.520 | 0.583 | 0.713 | 0.864 | 1.039 | | |
| 12 | | 0.168 | 0.168 | 0.168 | 0.168 | 0.204 | 0.271 | 0.351 | 0.445 | 0.554 | 0.554 | 0.629 | 0.760 | 0.910 | | |
| 13 | | 0.168 | 0.168 | 0.168 | 0.168 | 0.185 | 0.244 | 0.316 | 0.401 | 0.501 | 0.588 | 0.588 | 0.679 | 0.812 | 0.963 | |
| 14 | | | 0.168 | 0.168 | 0.168 | 0.168 | 0.223 | 0.288 | 0.365 | 0.455 | 0.560 | 0.623 | 0.623 | 0.733 | 0.868 | |
| 15 | | | | 0.168 | 0.168 | 0.168 | 0.204 | 0.264 | 0.335 | 0.417 | 0.513 | 0.623 | 0.658 | 0.669 | 0.791 | |
| 16 | | | | | 0.168 | 0.168 | 0.189 | 0.244 | 0.309 | 0.385 | 0.474 | 0.575 | 0.690 | 0.693 | 0.727 | |
| 17 | | | | | 0.168 | 0.168 | 0.176 | 0.227 | 0.287 | 0.358 | 0.440 | 0.533 | 0.640 | 0.729 | 0.729 | 0.788 |
| 18 | | | | | | | 0.168 | 0.212 | 0.269 | 0.334 | 0.411 | 0.498 | 0.597 | 0.709 | 0.764 | 0.764 |
| 19 | | | | | | | | 0.199 | 0.252 | 0.314 | 0.385 | 0.467 | 0.559 | 0.664 | 0.782 | 0.800 |
| 20 | | | | | | | | 0.188 | 0.237 | 0.295 | 0.362 | 0.439 | 0.526 | 0.625 | 0.735 | 0.836 |
| 21 | | | | | | | | | 0.224 | 0.279 | 0.342 | 0.415 | 0.497 | 0.590 | 0.694 | 0.810 |
| 22 | | | | | | | | | | 0.265 | 0.325 | 0.393 | 0.471 | 0.558 | 0.657 | 0.766 |
| 23 | | | | | | | | | | | 0.308 | 0.373 | 0.447 | 0.530 | 0.624 | 0.727 |
| 24 | | | | | | | | | | | 0.294 | 0.356 | 0.426 | 0.505 | 0.594 | 0.692 |
| 25 | | | | | | | | | | | | 0.340 | 0.407 | 0.482 | 0.566 | 0.661 |
| 26 | | | | | | | | | | | | | 0.389 | 0.461 | 0.542 | 0.632 |
| 27 | | | | | | | | | | | | | | 0.442 | 0.519 | 0.605 |


NOTE:

THE WALL HEIGHT IS EQUAL TO THE BARREL HEIGHT (HT) PLUS THE TOP SLAB THICKNESS (TS). WHEN WALL HEIGHT IS IN BETWEEN OR OUTSIDE TABULATED WALL HEIGHTS, THE AREA OF STEEL REQUIRED SHOULD BE INTERPOLATED BETWEEN OR EXTRAPOLATED FROM ADJACENT AREAS OF STEEL USING THE ACTUAL WALL HEIGHT.

IF AREA OF STEEL IN THE WALL OF THE CULVERT (J4 BARS) IS GREATER THAN THAT INDICATED IN THE TABLE, USE THE SAME SIZE AND SPACING FOR THE J5 BARS IN THE WINGS. HOWEVER, IF THE AREA OF STEEL PROVIDED BY MATCHING SIZE AND SPACING OF THE J4 BARS IS INSUFFICIENT, INCREASE THE SIZE OF THE J5 BARS (#8 MAX.) AND/OR DECREASE THE SPACING OF THE J5 BARS (6" MIN.). USE SMALLEST BAR SIZE POSSIBLE BASED ON MINIMUM SPACING.

MINIMUM STEEL TO BE USED IN THE WINGS FOR J5 BARS IS #4 BARS AT 14" CENTERS (AREA OF STEEL = 0.1683 SQ. IN./FT.)

Ⓢ SEE STANDARD PLAN 703.37C, SHEET 2 OF 2 FOR BACKFILL SLOPE TO BE USED BASED ON SKEW.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

CONCRETE BOX CULVERT
EXTERIOR WING REINFORCEMENT

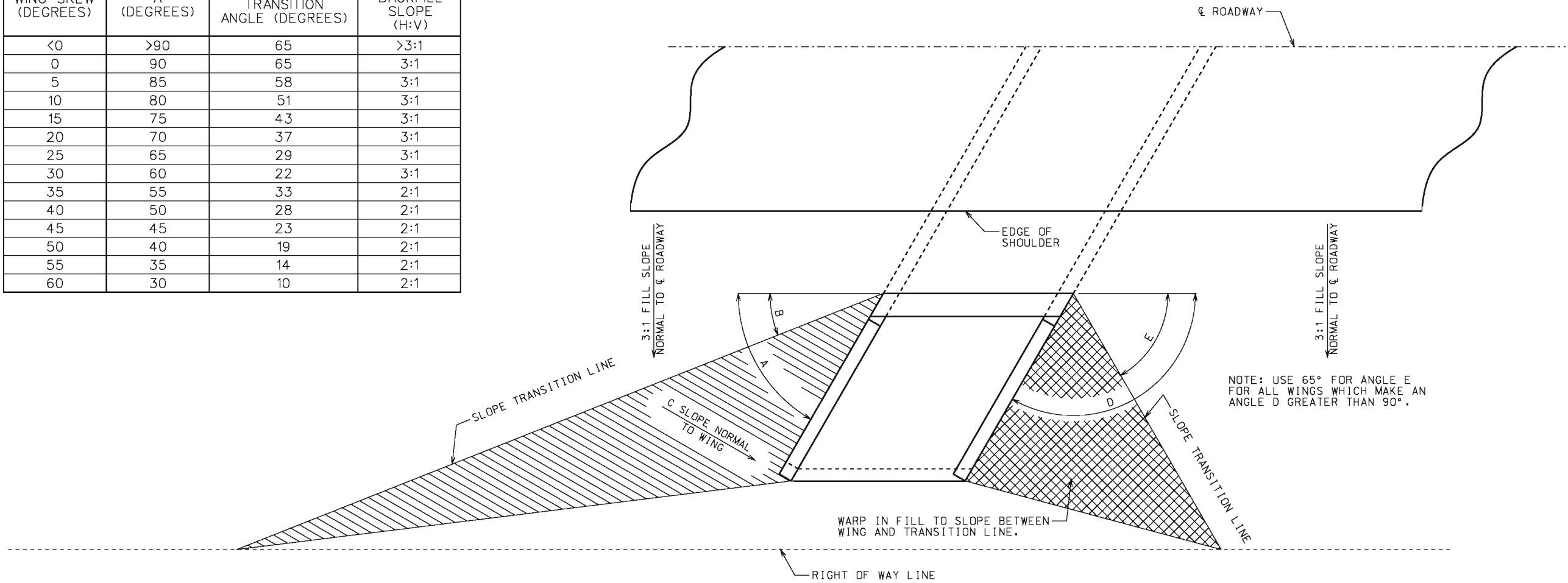
DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/18/2011

703.37C

SHEET NO.
1 OF 2


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| WING BACKFILL TABLE | | | |
|------------------------|----------------|------------------------------------|---------------------------------|
| WING SKEW (DEGREES) | A (DEGREES) | B TRANSITION ANGLE (DEGREES) | C BACKFILL SLOPE (H:V) |
| <0 | >90 | 65 | >3:1 |
| 0 | 90 | 65 | 3:1 |
| 5 | 85 | 58 | 3:1 |
| 10 | 80 | 51 | 3:1 |
| 15 | 75 | 43 | 3:1 |
| 20 | 70 | 37 | 3:1 |
| 25 | 65 | 29 | 3:1 |
| 30 | 60 | 22 | 3:1 |
| 35 | 55 | 33 | 2:1 |
| 40 | 50 | 28 | 2:1 |
| 45 | 45 | 23 | 2:1 |
| 50 | 40 | 19 | 2:1 |
| 55 | 35 | 14 | 2:1 |
| 60 | 30 | 10 | 2:1 |



PLAN OF WINGS AND SLOPE TRANSITION LINES

NOTE: BACKFILL TRANSITION ANGLE AND BACKFILL SLOPE SHALL APPLY TO ALL BOX CULVERTS REGARDLESS OF TYPE - SINGLE, DOUBLE, OR TRIPLE.



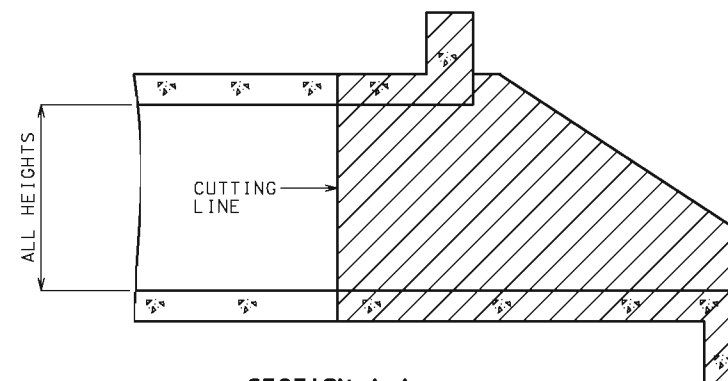
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

CONCRETE BOX CULVERT
EXTERIOR WING BACKFILL
SLOPE TRANSITION

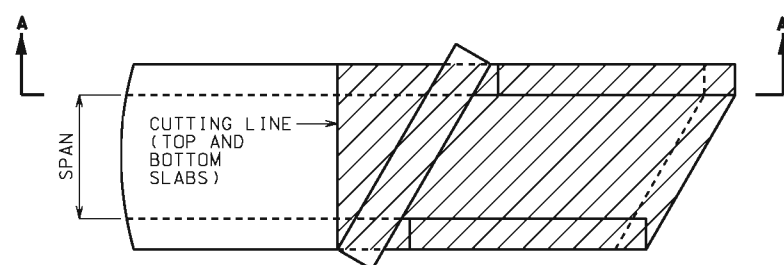
STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

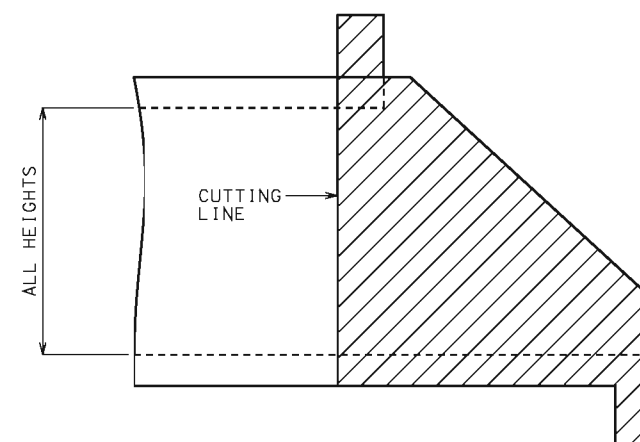
| | | | |
|-----------------|------------|---------|---------------------|
| DATE EFFECTIVE: | 04/01/2011 | 703.37C | SHEET NO. 2 OF 2 |
| DATE PREPARED: | 4/18/2011 | | |



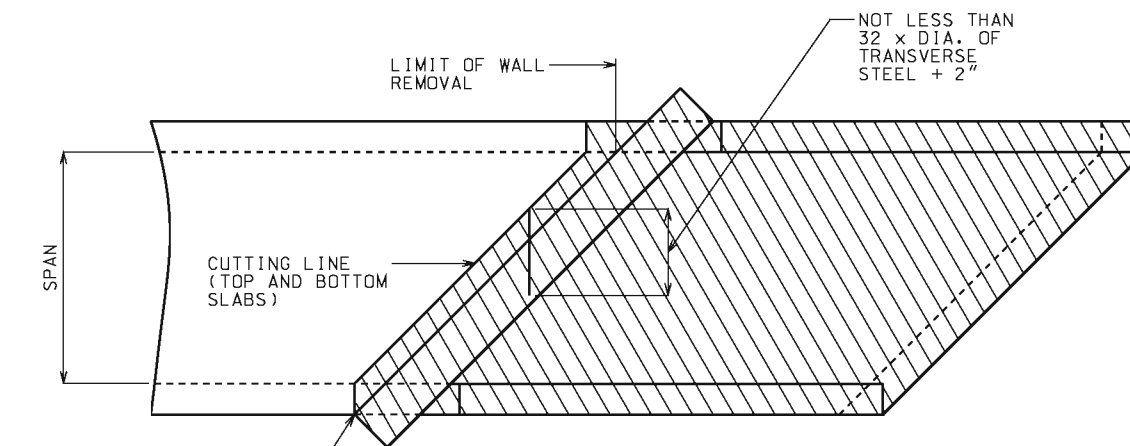
SECTION A-A



PLAN

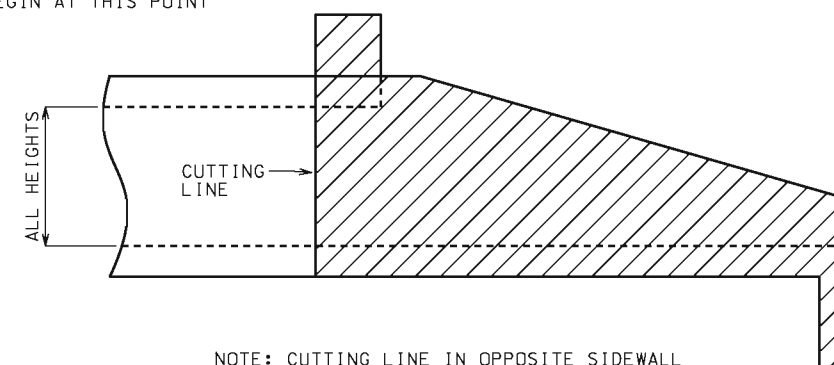


SIDE ELEVATION
NO SKEW OR SKEWS LESS THAN 20°



CUT IN TOP AND BOTTOM
SLABS ALWAYS TO
BEGIN AT THIS POINT

PLAN



NOTE: CUTTING LINE IN OPPOSITE SIDEWALL
IS TO MEET CUT IN BOTTOM SLAB.

SIDE ELEVATION
SKEW OF 20° OR MORE

GENERAL NOTES:



THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

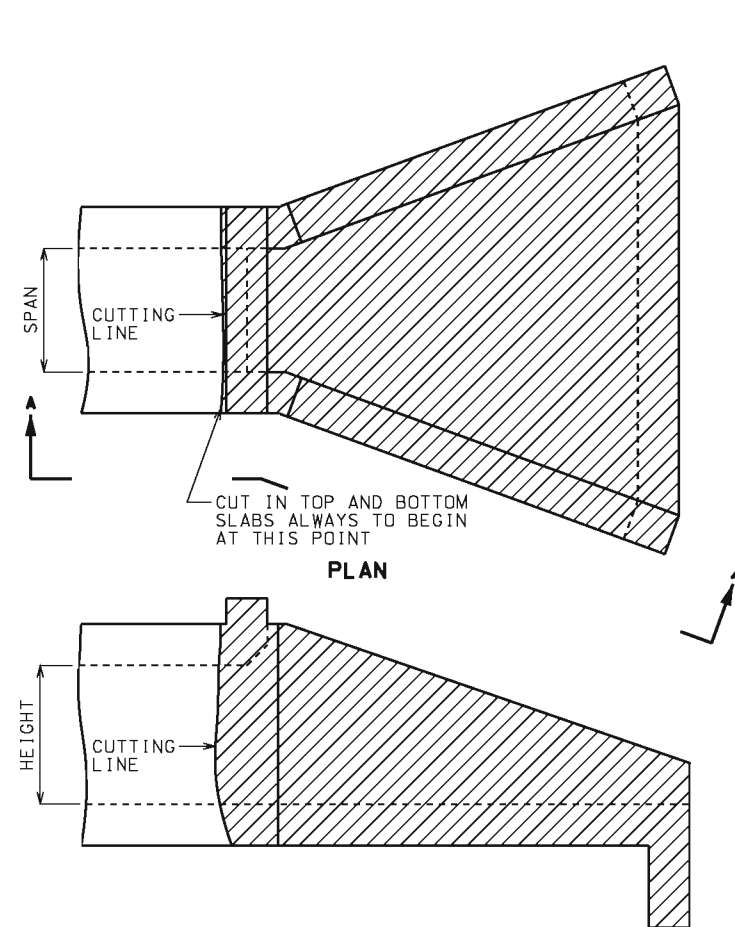
ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED, THAT ARE BONDED IN UNDISTURBED OLD CONCRETE, SHALL BE CLEANLY STRIPPED, STRAIGHTENED, AND EXTENDED INTO NEW CONCRETE.

SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

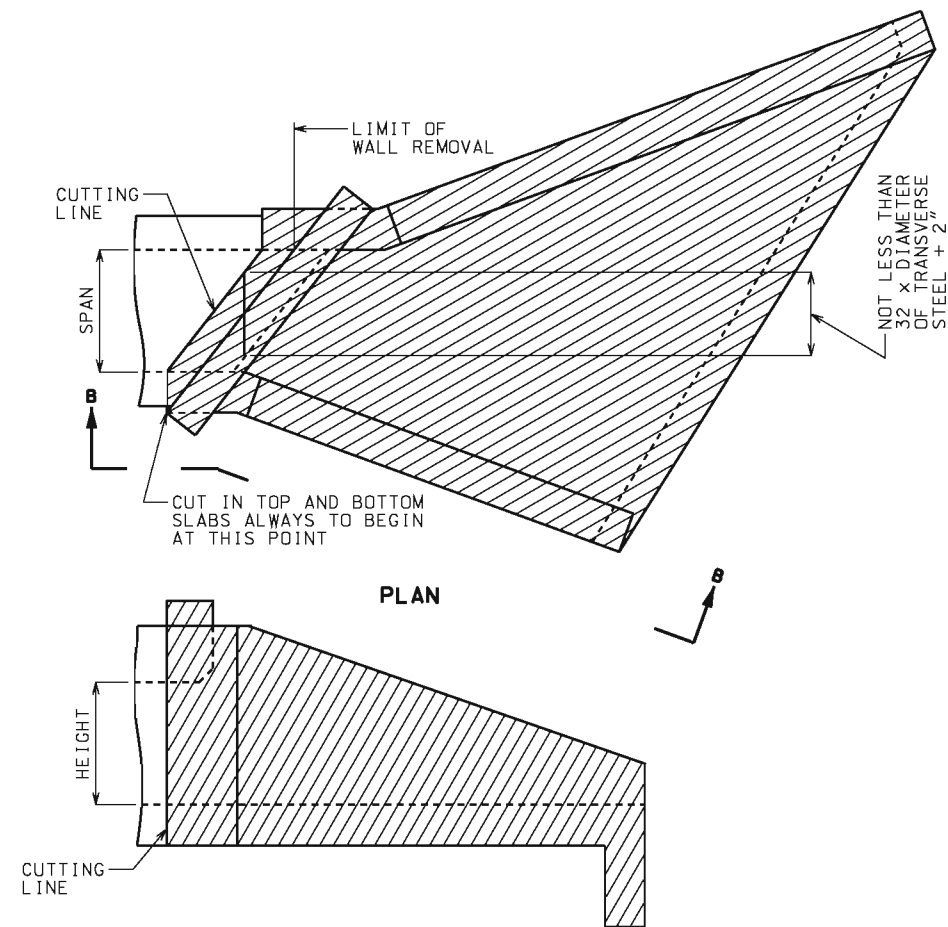
A CONTINUOUS V-GROOVE AT LEAST 1" IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.

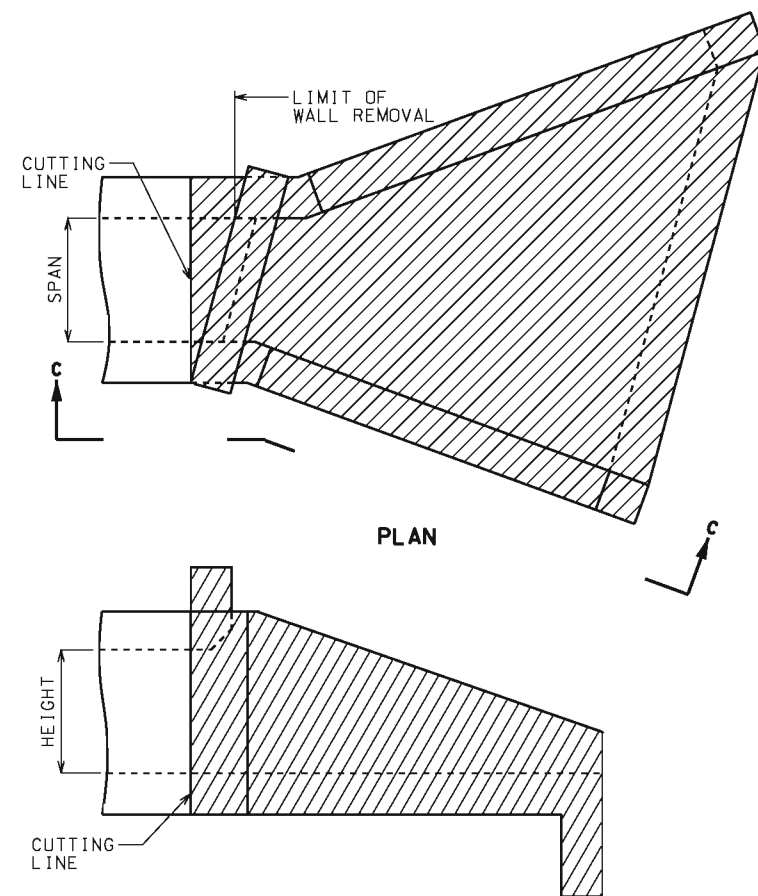
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE BOX CULVERTS CUTTING DETAILS EXTENSION TO STRAIGHT WINGS |
| DATE EFFECTIVE: 10-01-2009 DATE PREPARED: 8/18/2009 | 703.38A |
| SHEET NO. 1 OF 2 | |



ELEVATION A-A
NO SKEW



ELEVATION B-B
SKEWS OF 20° OR MORE



ELEVATION C-C
SKEWS LESS THAN 20°

GENERAL NOTES:

THE HATCHED PARTS OF THESE DRAWINGS INDICATE THOSE PORTIONS OF THE EXISTING CULVERT WHICH ARE TO BE REMOVED.

ALL REINFORCING BARS WITHIN AREAS SHOWN TO BE REMOVED, THAT ARE BONDED IN UNDISTURBED OLD CONCRETE, SHALL BE CLEANLY STRIPPED, STRAIGHTENED, AND EXTENDED INTO NEW CONCRETE.

SEE STANDARD SPECIFICATIONS FOR REQUIRED BUSHHAMMERING AND TREATING OF OLD CONCRETE SURFACES WHICH ARE TO RECEIVE NEW CONCRETE.

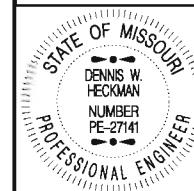
A CONTINUOUS V-GROOVE AT LEAST 1" IN DEPTH SHALL BE CUT ON THE FACE OF THE CONCRETE AS A GUIDE FOR THE LINE OF BREAK AND TO PREVENT SPALLING.

THE BOX EXTENSION OPENING SHALL BE BUILT TO MATCH THE EXISTING BOX OPENING. WHEN THE EXISTING OPENING DOES NOT MATCH A SIZE FROM THE TABLES, THE NEXT LARGER SIZE SHALL BE USED FOR DETERMINING THE MEMBER SIZES AND REINFORCEMENT.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



THIS SHEET HAS BEEN
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ELECTRONICALLY.

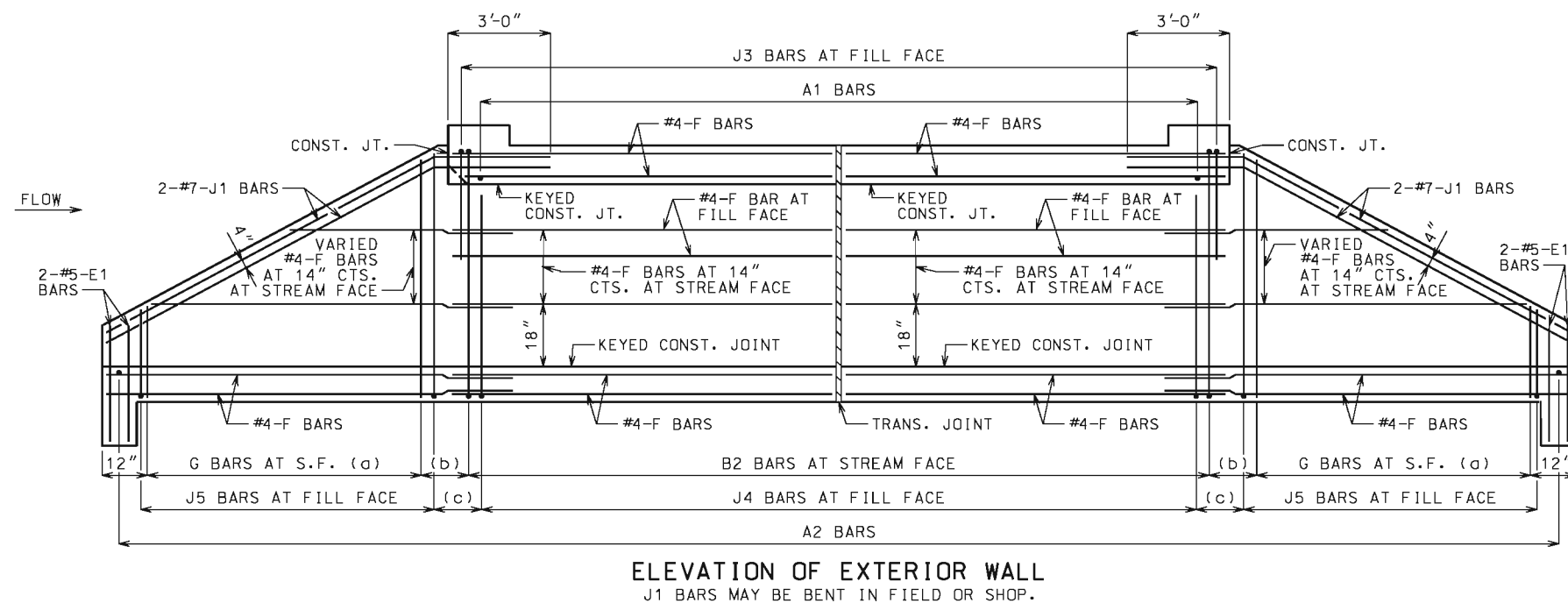
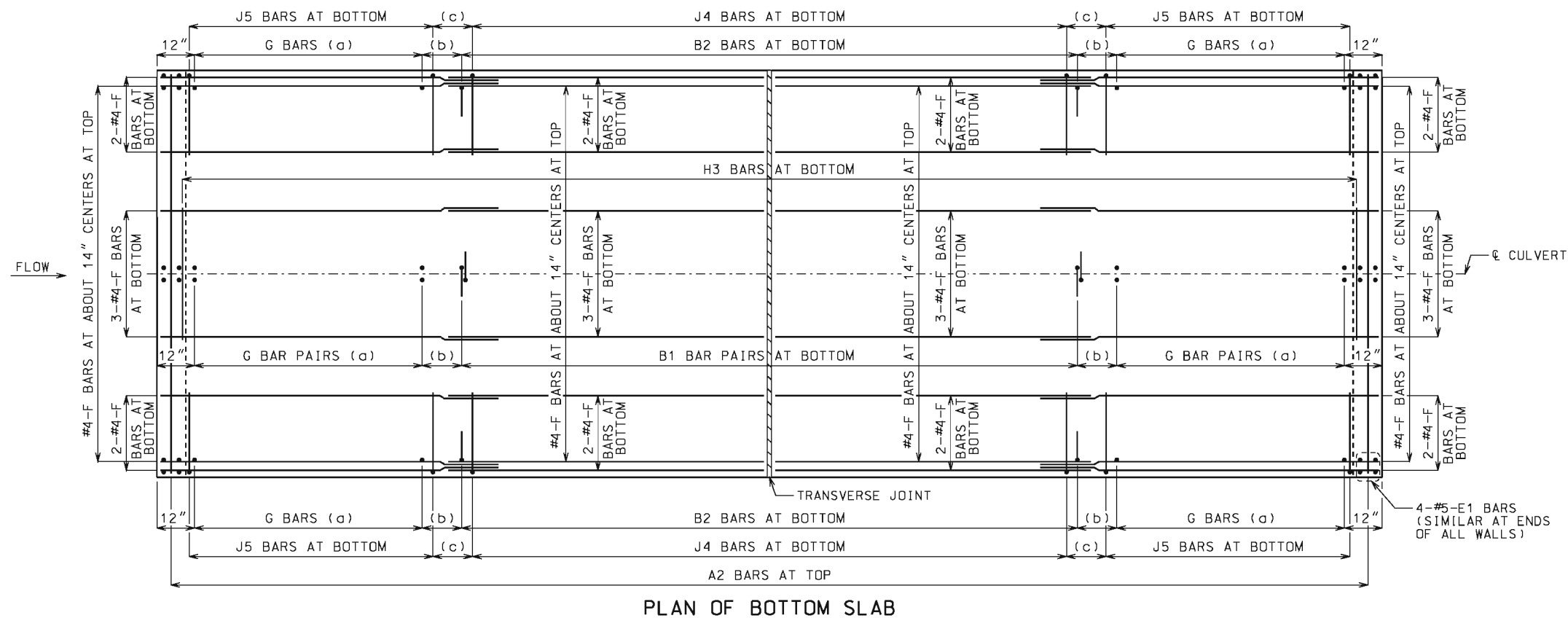
CONCRETE BOX CULVERTS

CUTTING DETAILS
EXTENSION TO FLARED WINGS

DATE EFFECTIVE: 10-01-2009
DATE PREPARED: 8/18/2009

703.38A

SHEET NO.
2 OF 2



LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".


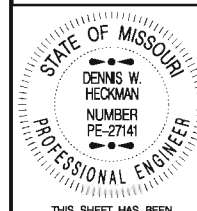
LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

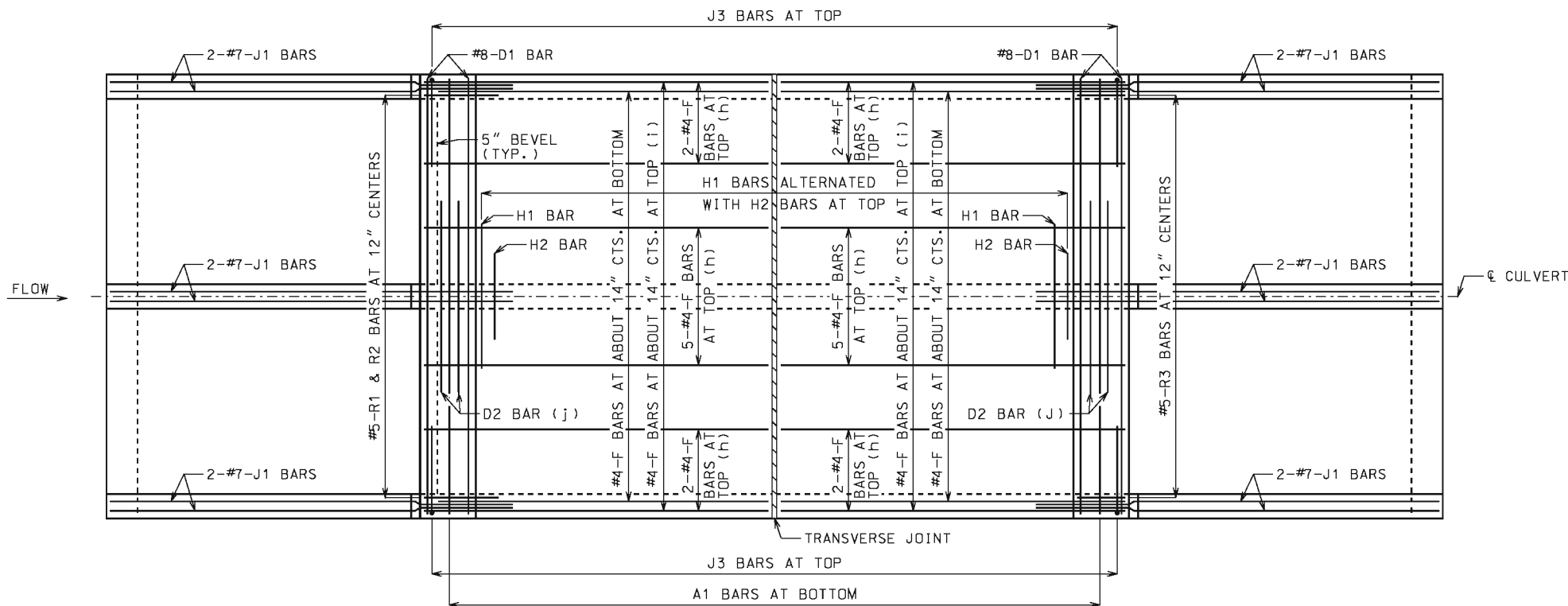
BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

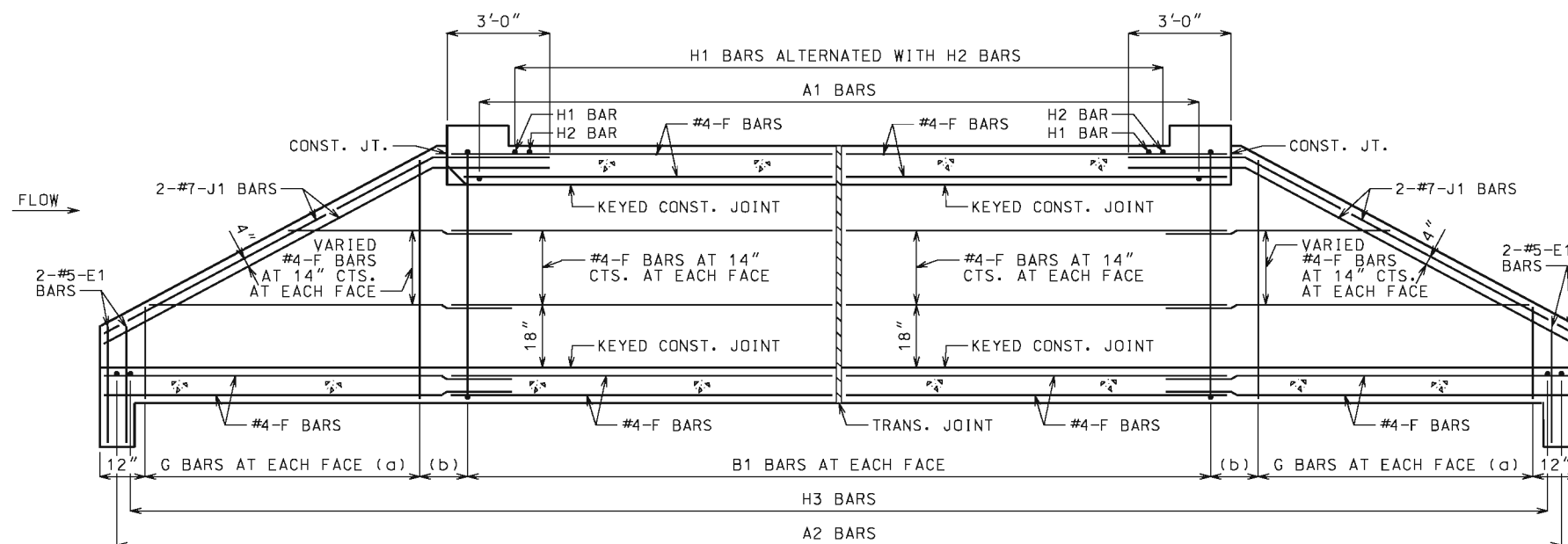
(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: SQUARED WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.40H |
| SHEET NO. 1 OF 3 | |



PLAN OF TOP SLAB
B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) NOT SPECIFIED ON THIS SHEET

(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"


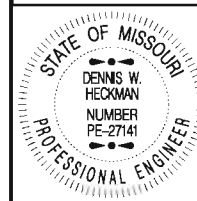
(i) FOR DESIGN FILLS 2'-0" OR LESS

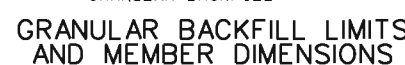
(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

#8 FOR CLEAR SPAN $> 10'-0"$

#9 FOR CLEAR SPAN $> 13'-0"$

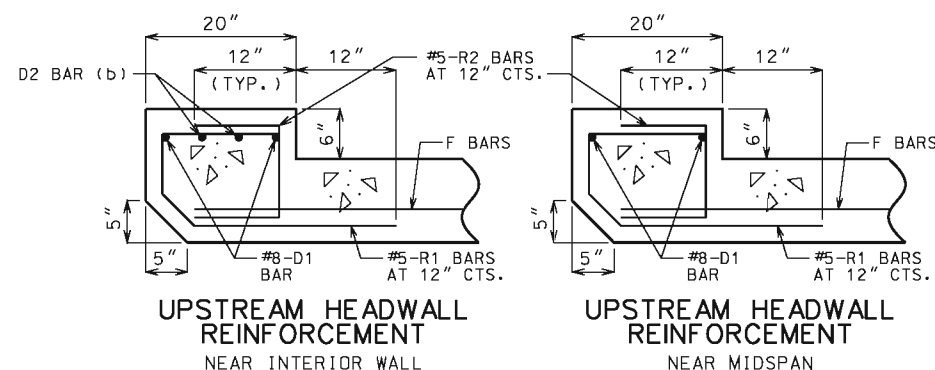
IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: SQUARED WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: <u>10/01/2011</u> DATE PREPARED: <u>5/13/2015</u> | 703.40H |
| SHEET NO. 2 OF 3 | |



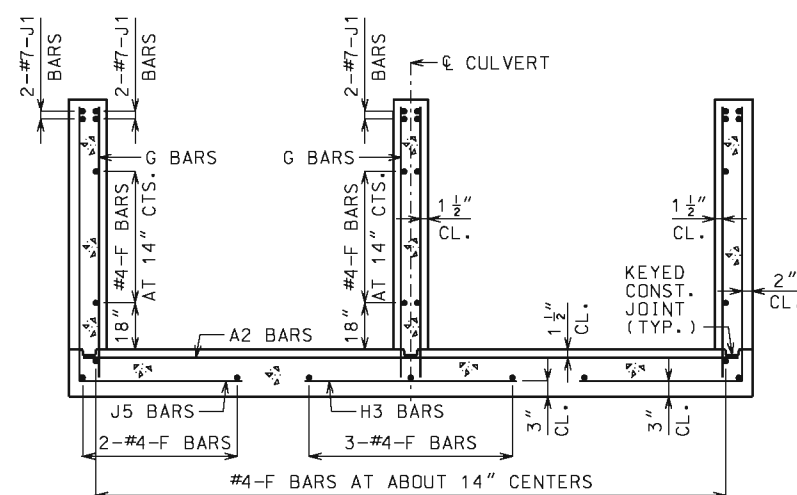
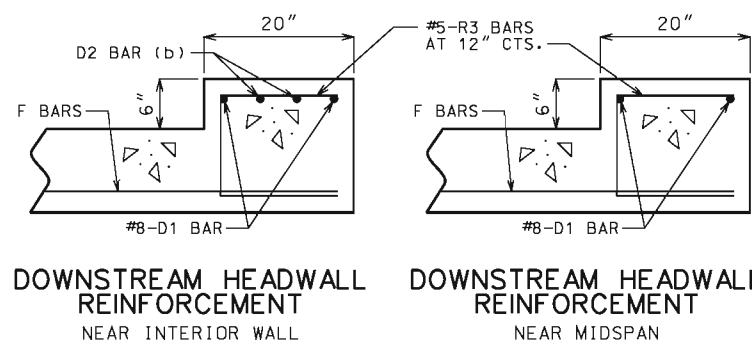
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

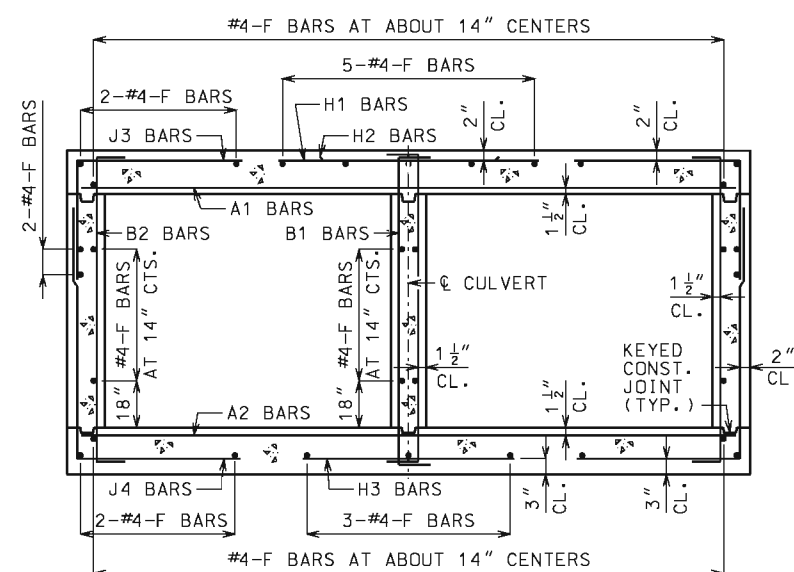


(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

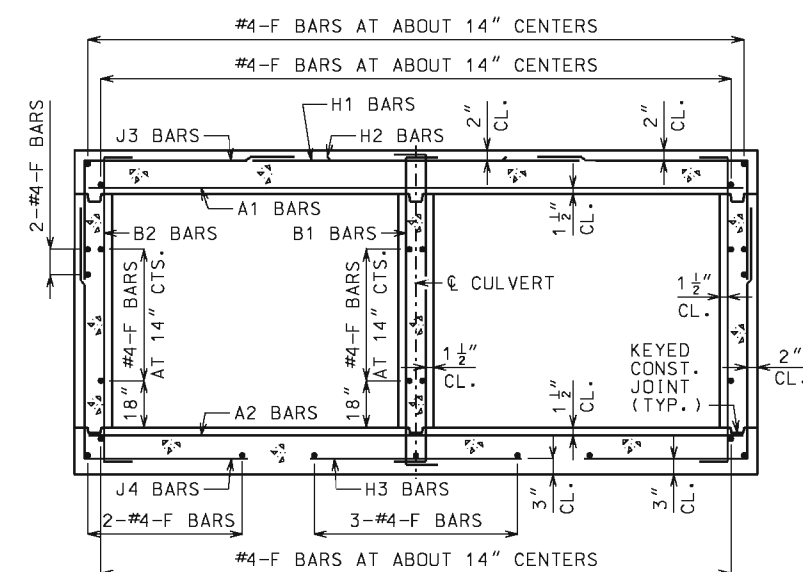
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

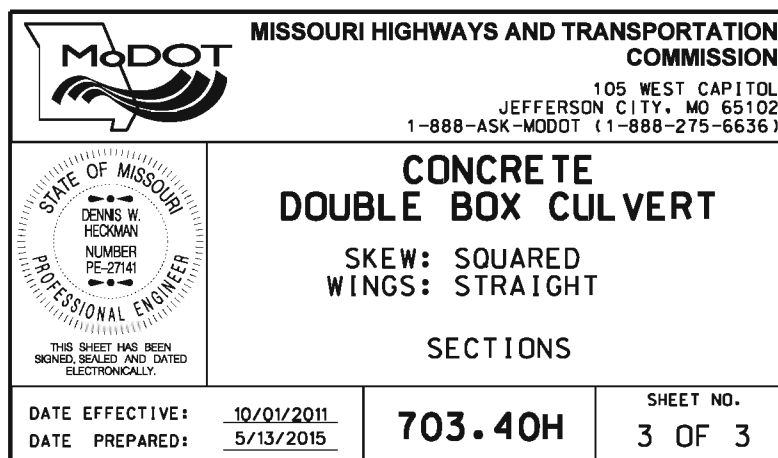
GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".



UNLESS SHOWN ON BRIDGE PLANS

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE
SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE
JOINT.

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.



J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



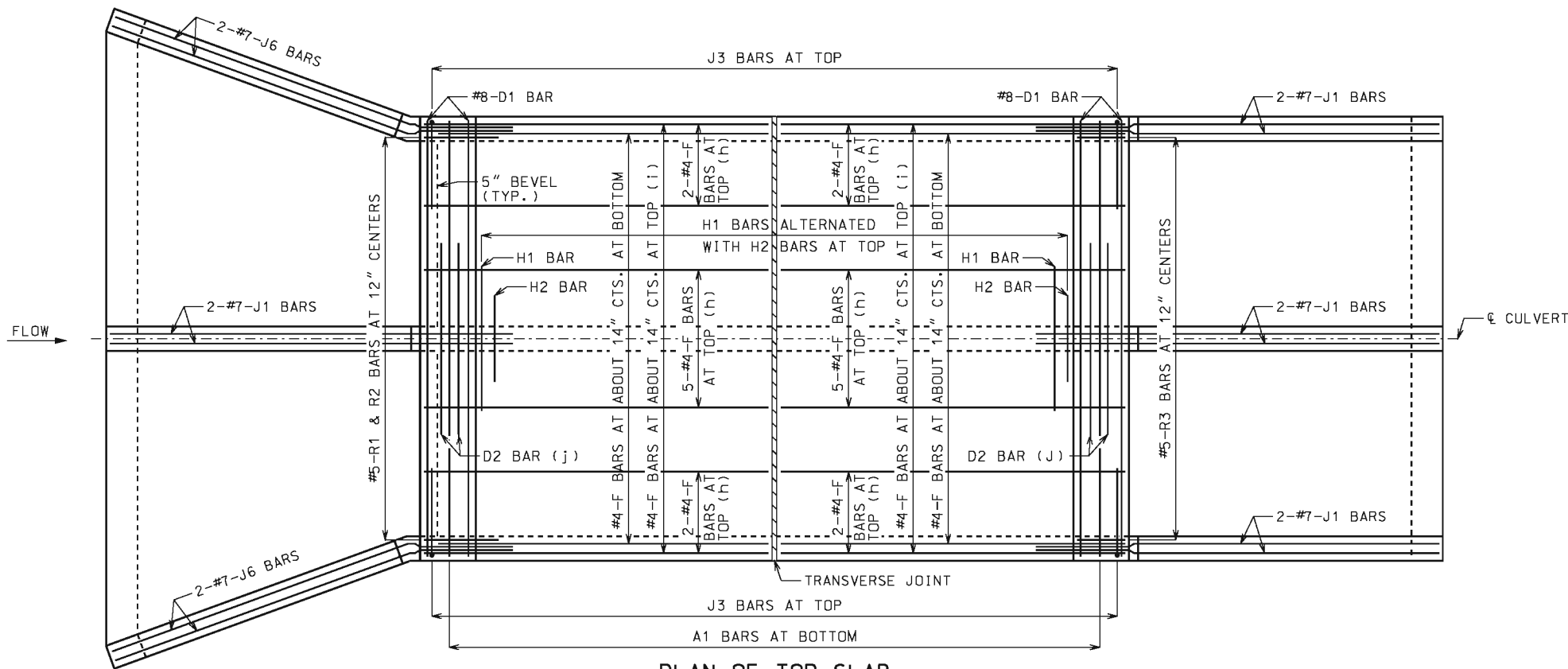
SKEW: SQUARED
WINGS: FLARED

REINFORCEMENT

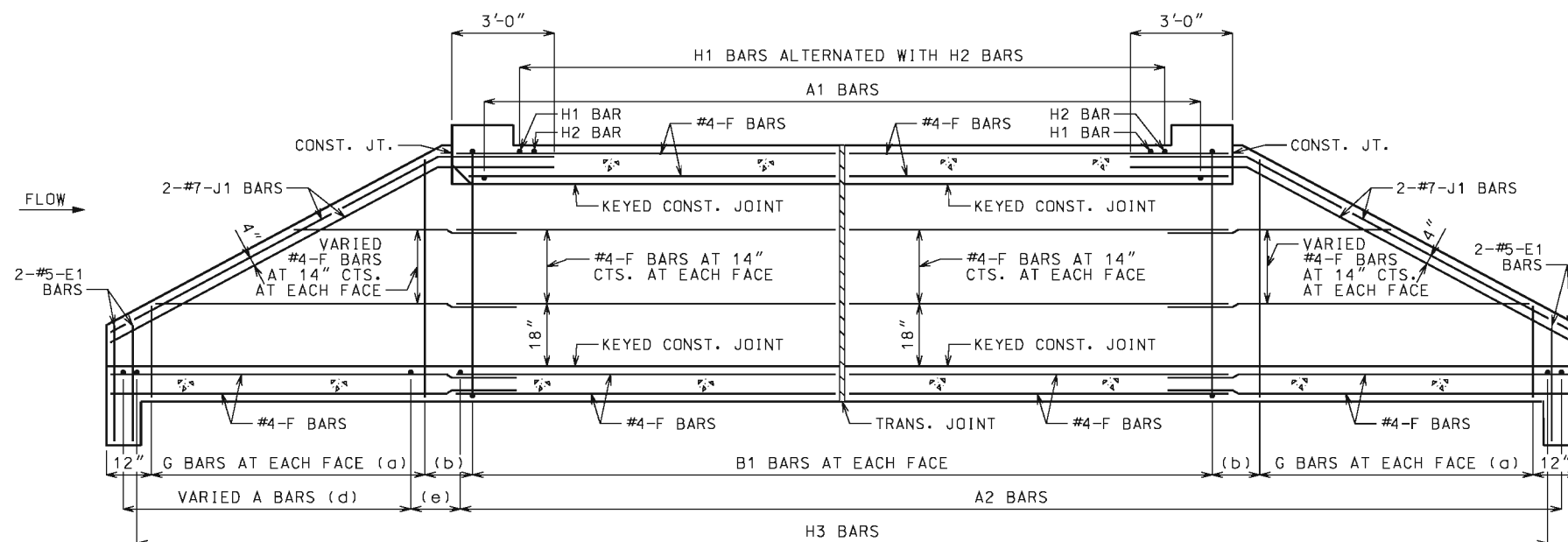
DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 5/13/2015

703.41H

SHEET NO. 1 OF 3



PLAN OF TOP SLAB
B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET

(h) FOR DESIGN FILLS OVER 2'-0"


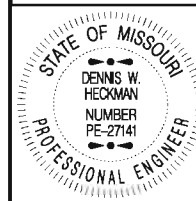
(i) FOR DESIGN FILLS 2'-0" OR LESS

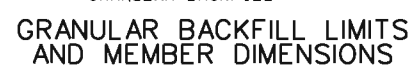
(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

#8 FOR CLEAR SPAN $> 10'-0"$

#9 FOR CLEAR SPAN $> 13'-0"$

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

| | |
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: SQUARED WINGS: FLARED REINFORCEMENT |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.41H |
| SHEET NO. 2 OF 3 | |



PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"



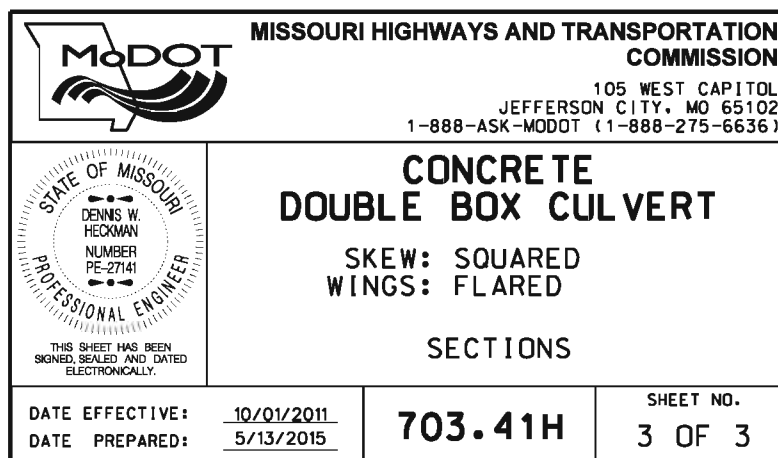
GENERAL NOTES:

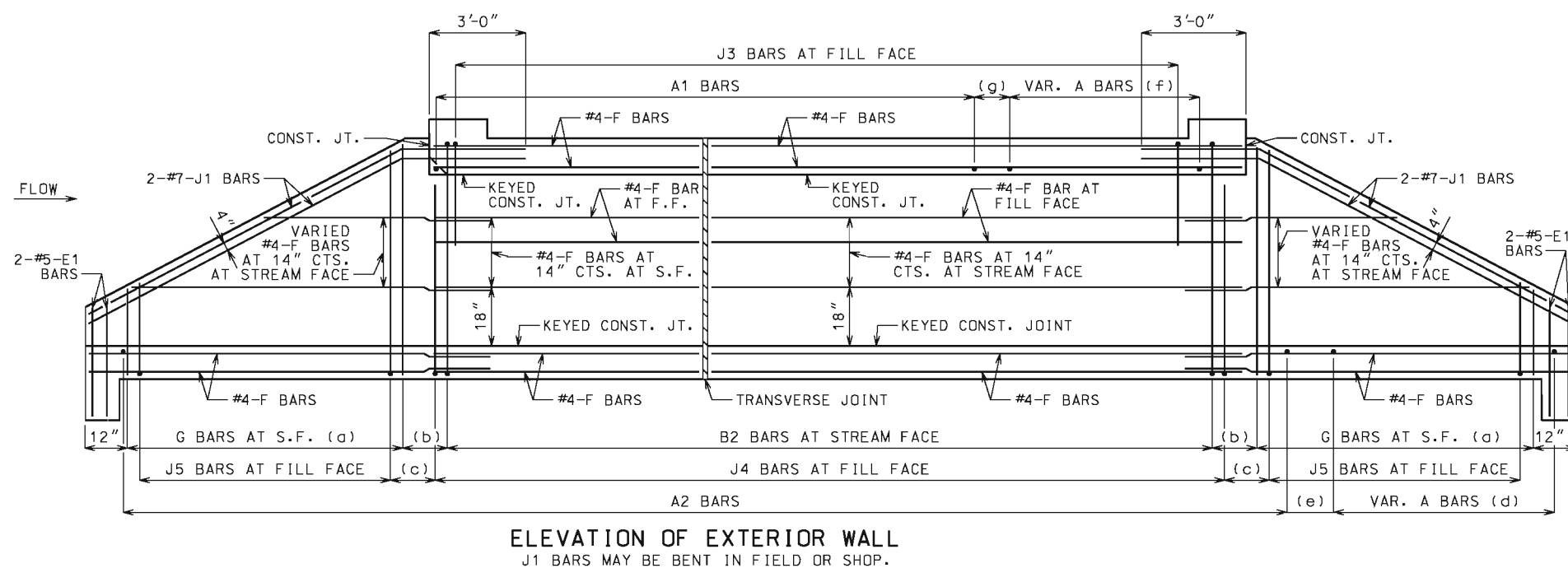
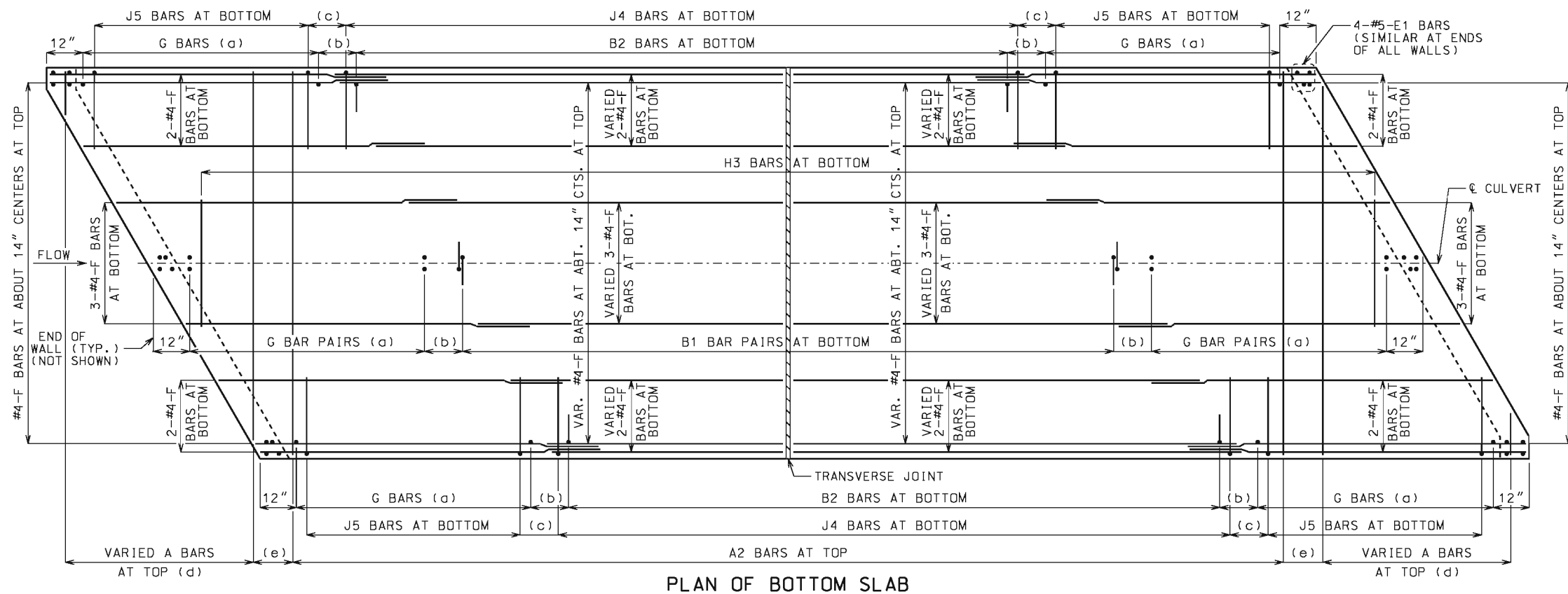
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO @ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".





LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

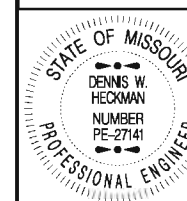
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

**CONCRETE
DOUBLE BOX CULVERT**

**SKEW: LEFT ADVANCE
WINGS: STRAIGHT**

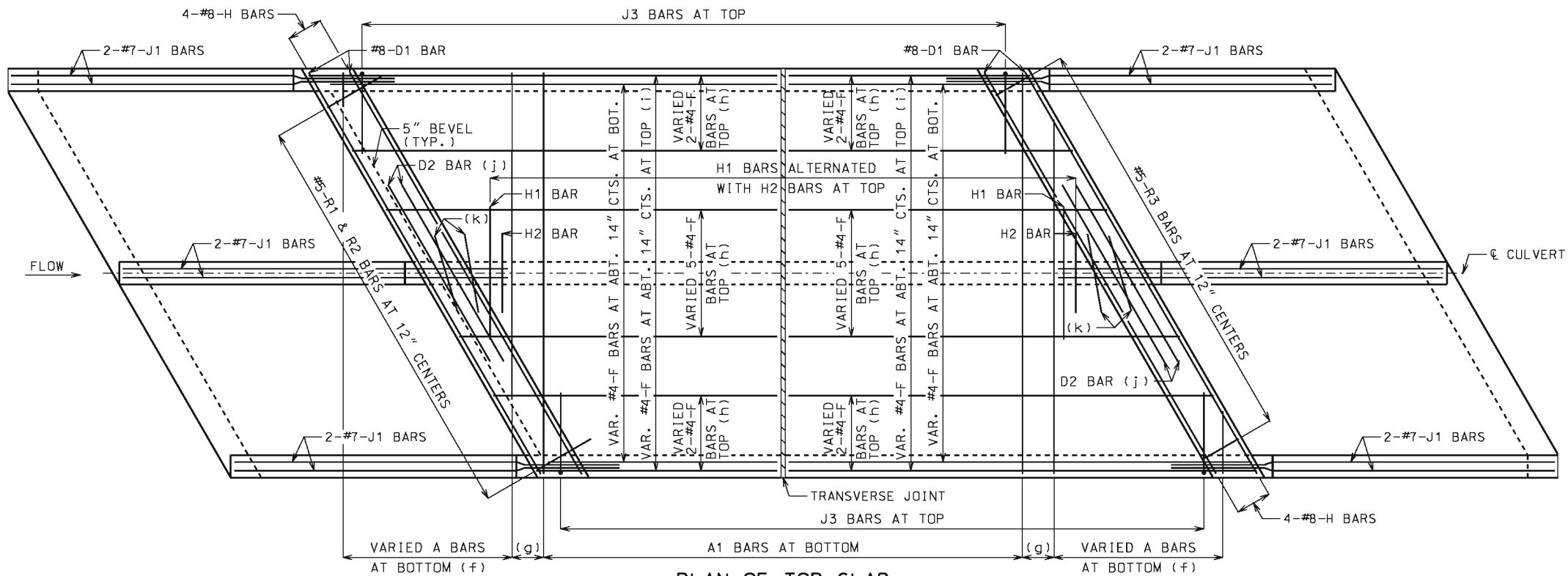
REINFORCEMENT

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 5/13/2015

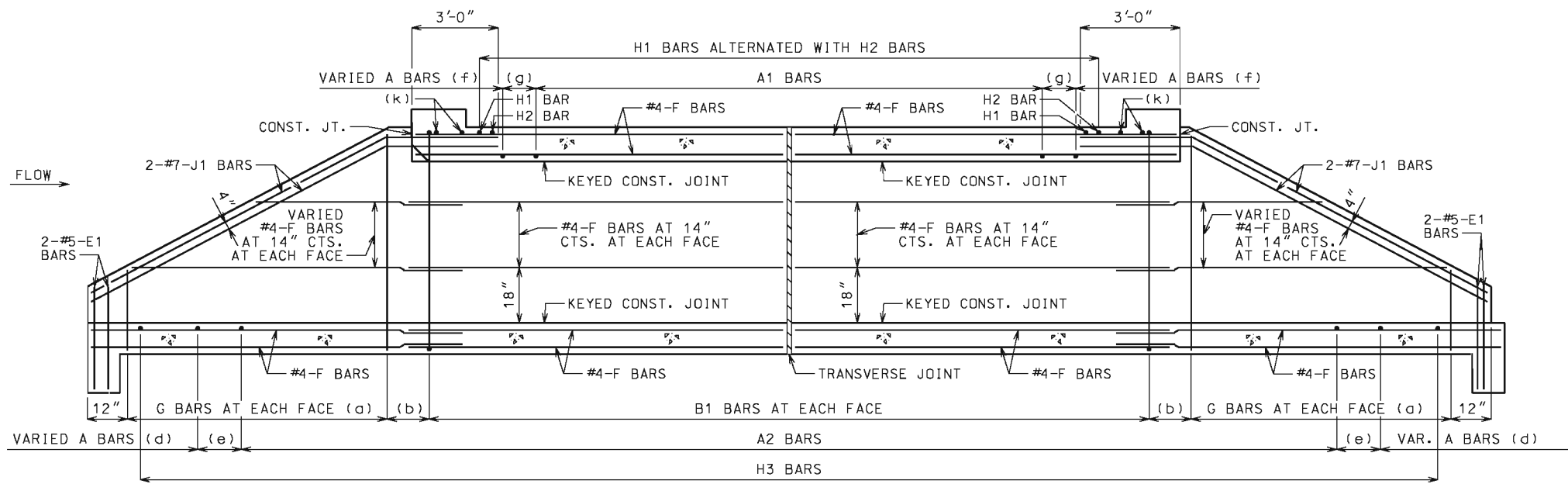
703.42H

SHEET NO.
1 OF 3

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN OF TOP SLAB
B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3.
3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"



#8 FOR CLEAR SPAN > 10'-0"

#9 FOR CLEAR SPAN > 13'-0"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF CL WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN.

THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

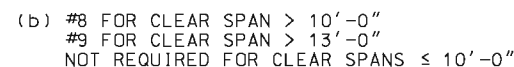
(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

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|---|--|---------------------|
|  | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT | |
| | SKEW: LEFT ADVANCE WINGS: STRAIGHT | |
| REINFORCEMENT | | SHEET NO. 2 OF 3 |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | | 703.42H |

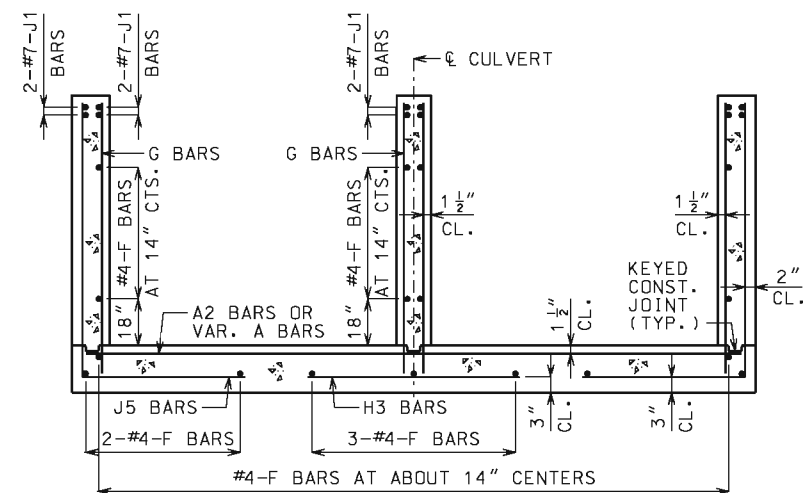


PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

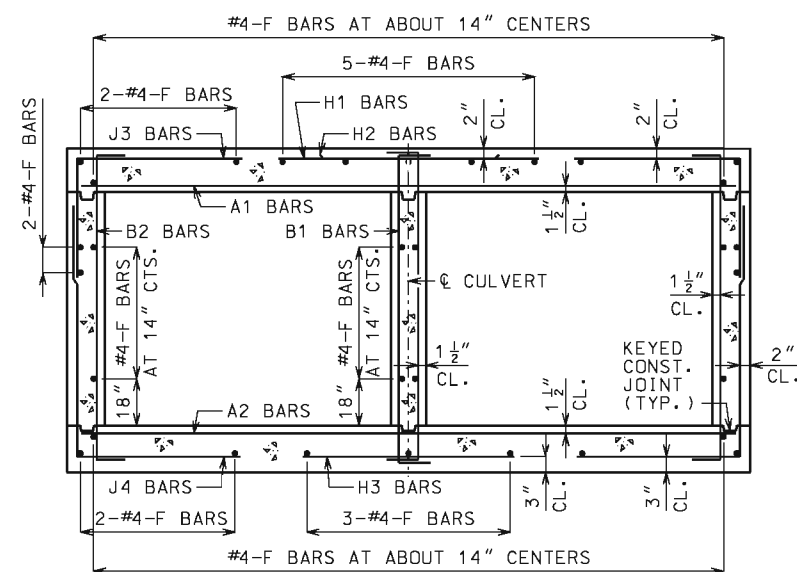
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



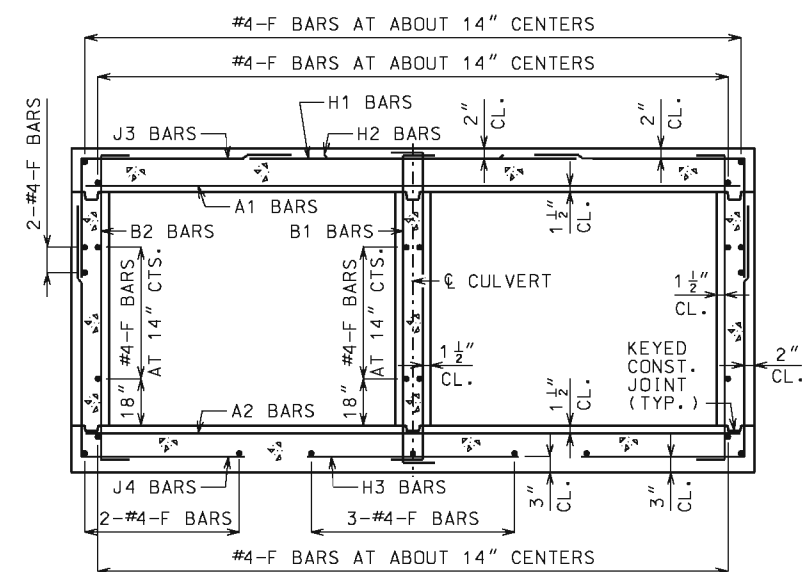
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT FOR DESIGN FILLS 2'-0" OR LESS

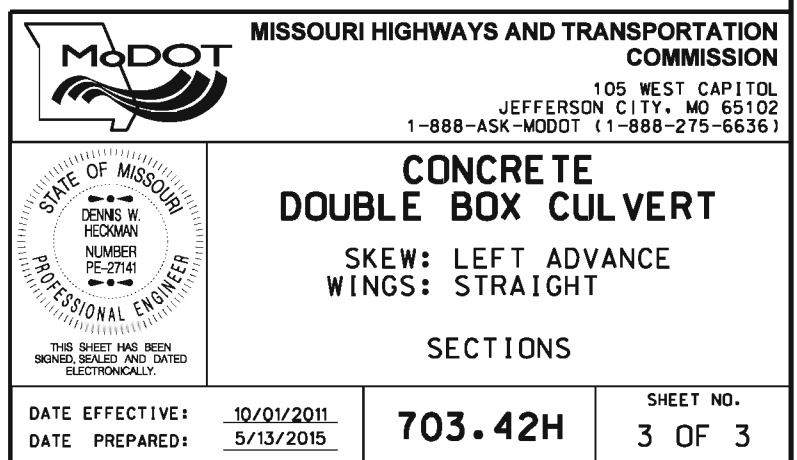
GENERAL NOTES:

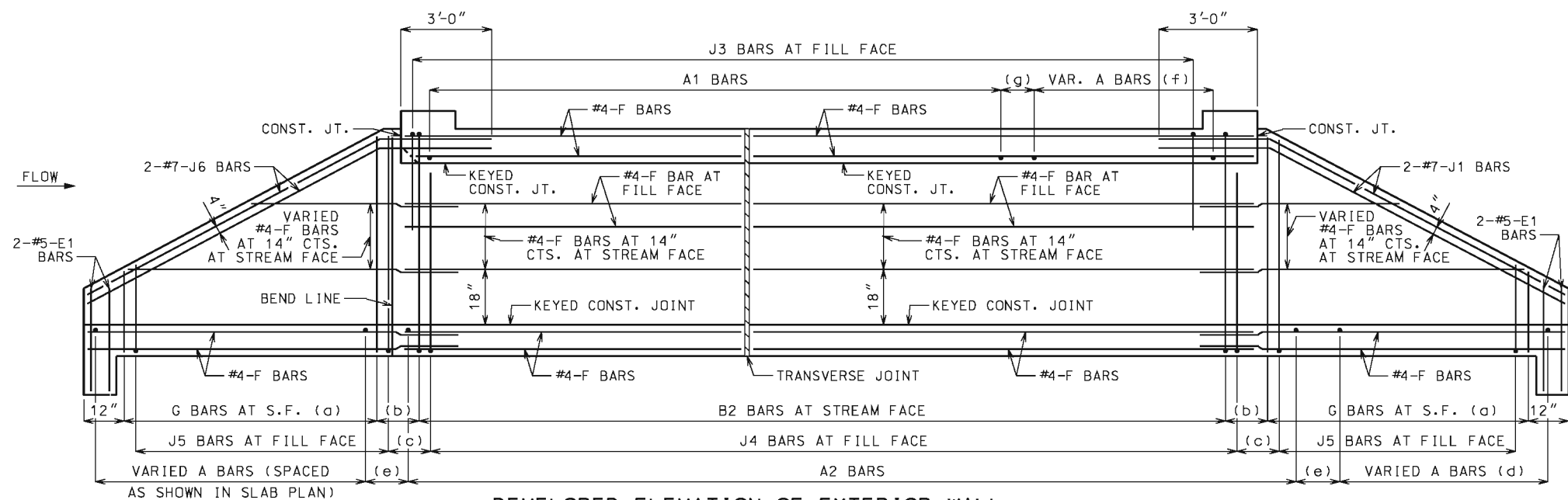
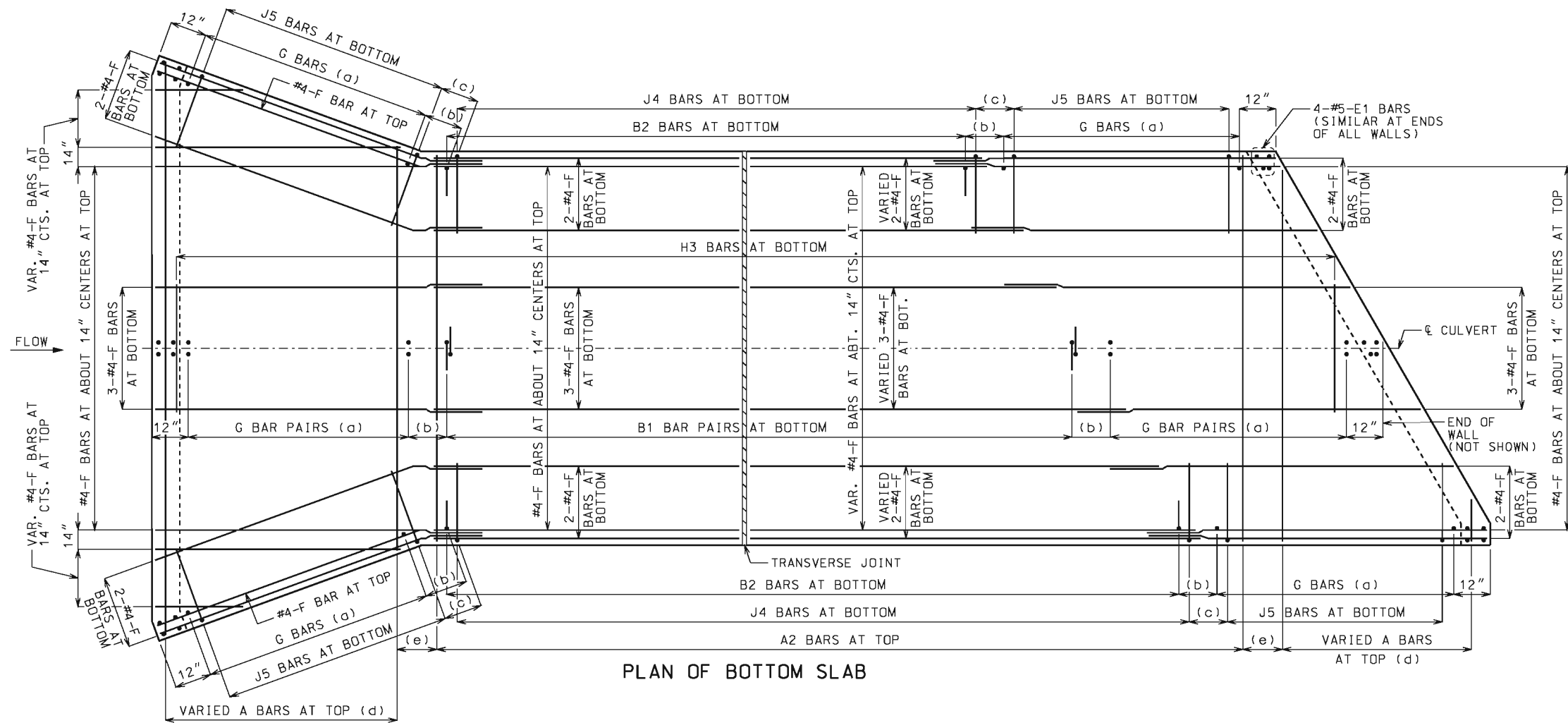
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".





J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION. BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM



(c) J4 BAR SPACING

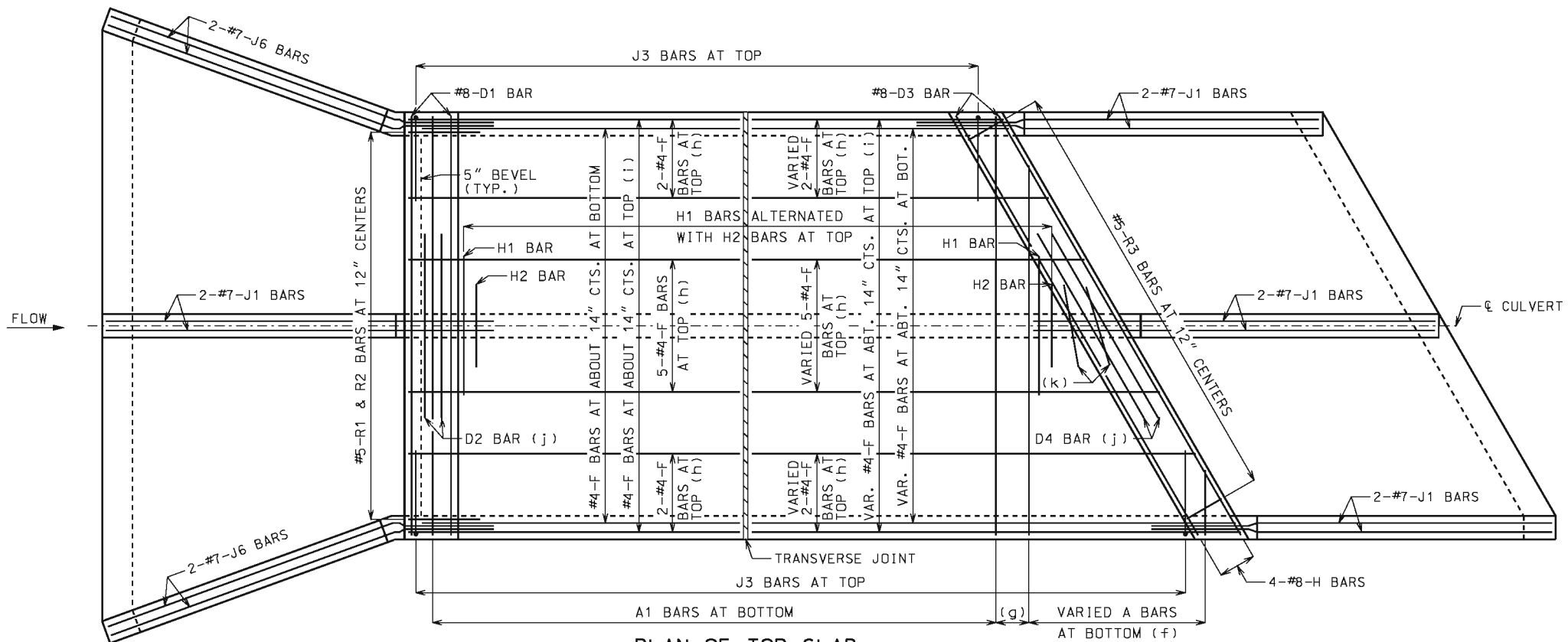
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

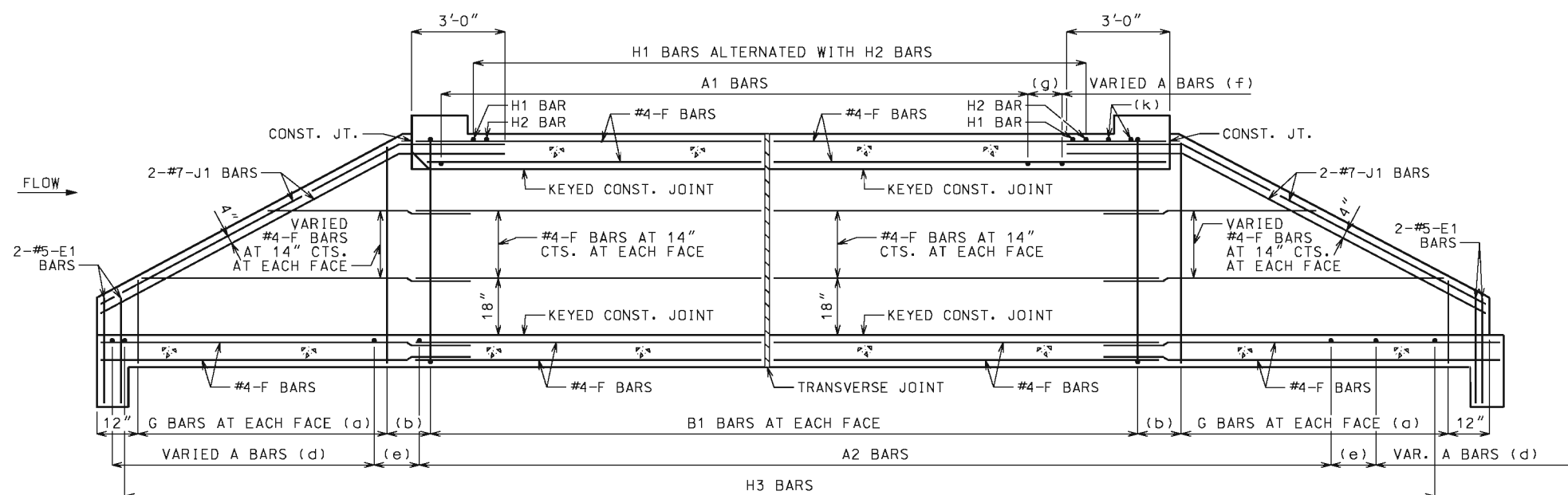
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: FLARED REINFORCEMENT |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.43H |
| SHEET NO. 1 OF 3 | |



PLAN OF TOP SLAB
B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

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(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS



(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

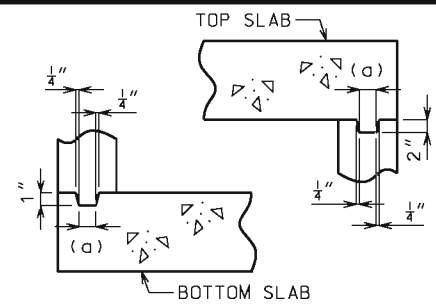
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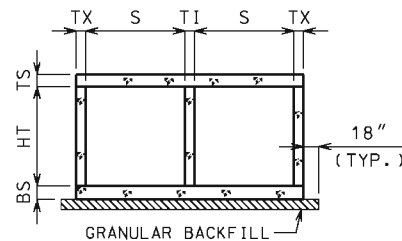
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(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

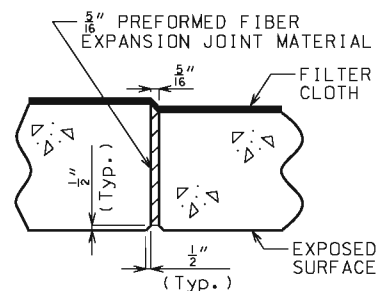
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|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: FLARED REINFORCEMENT |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.43H |
| SHEET NO. 2 OF 3 | |



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



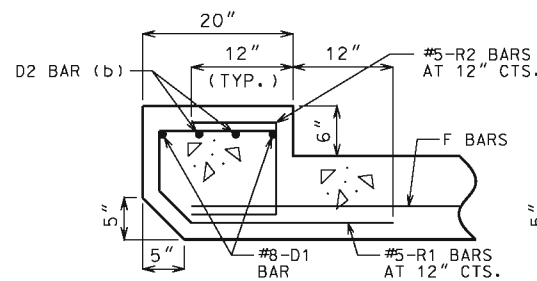
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



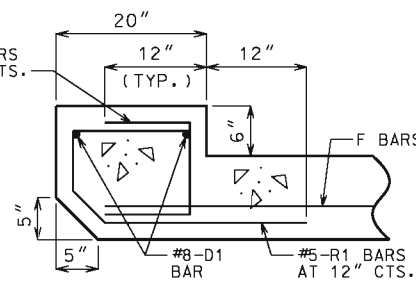
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

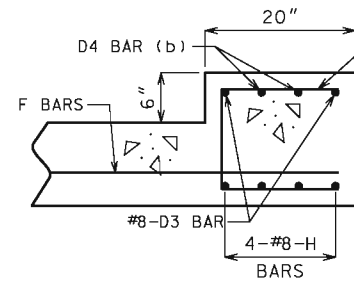
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



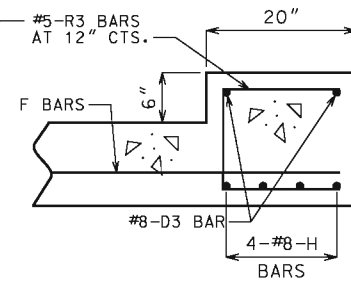
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



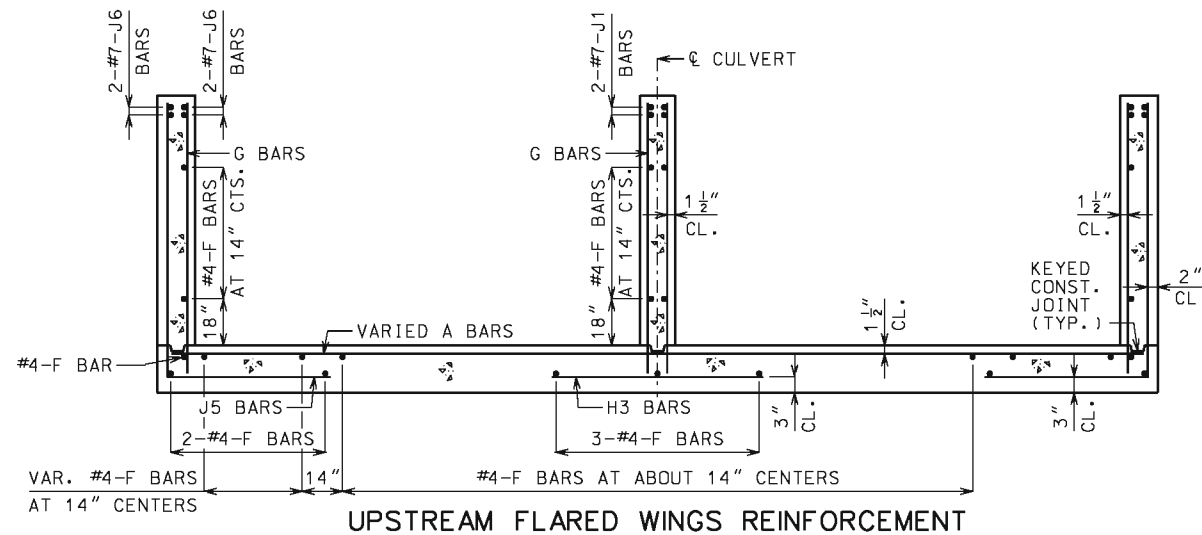
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



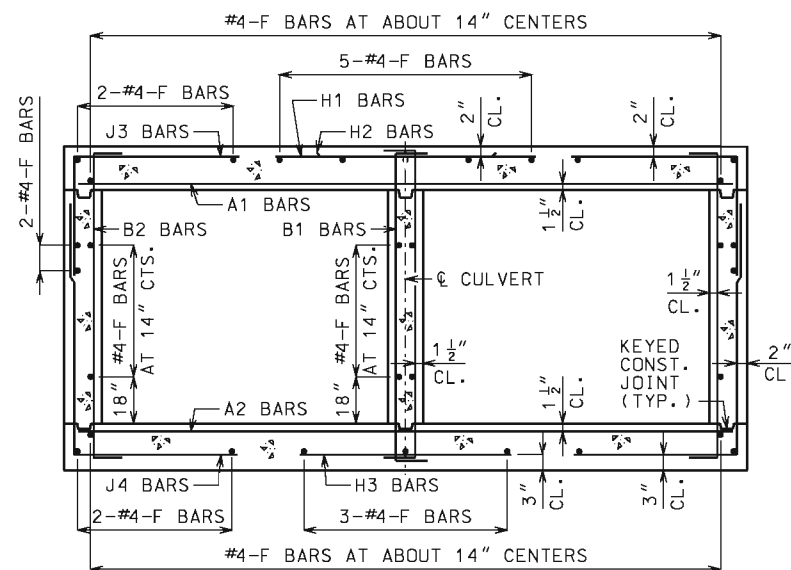
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

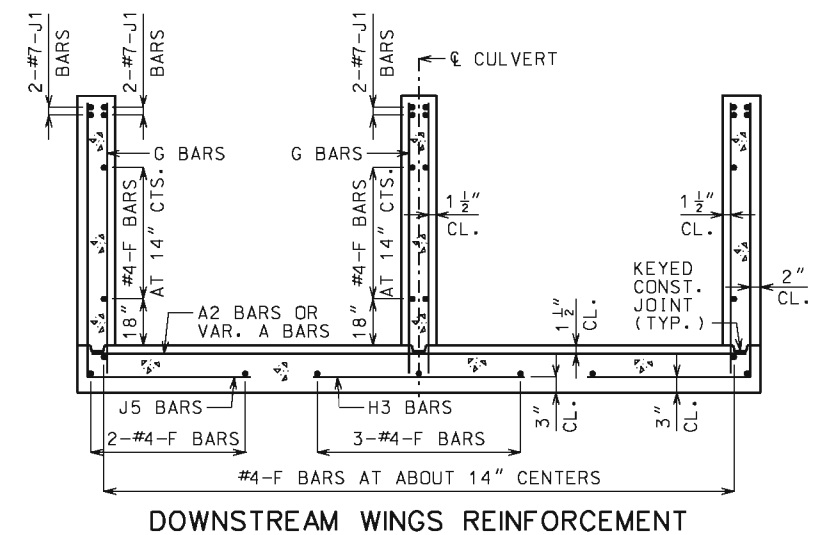
IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



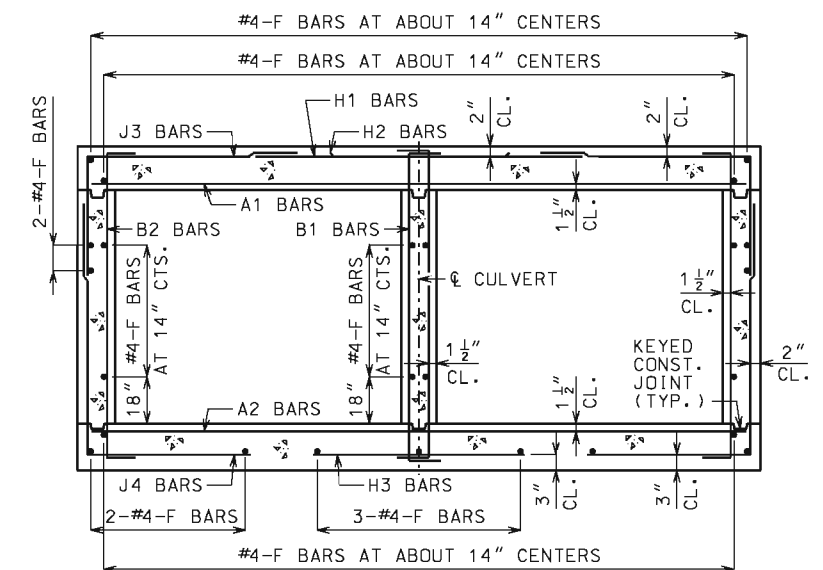
UPSTREAM FLARED WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS



GENERAL NOTES:

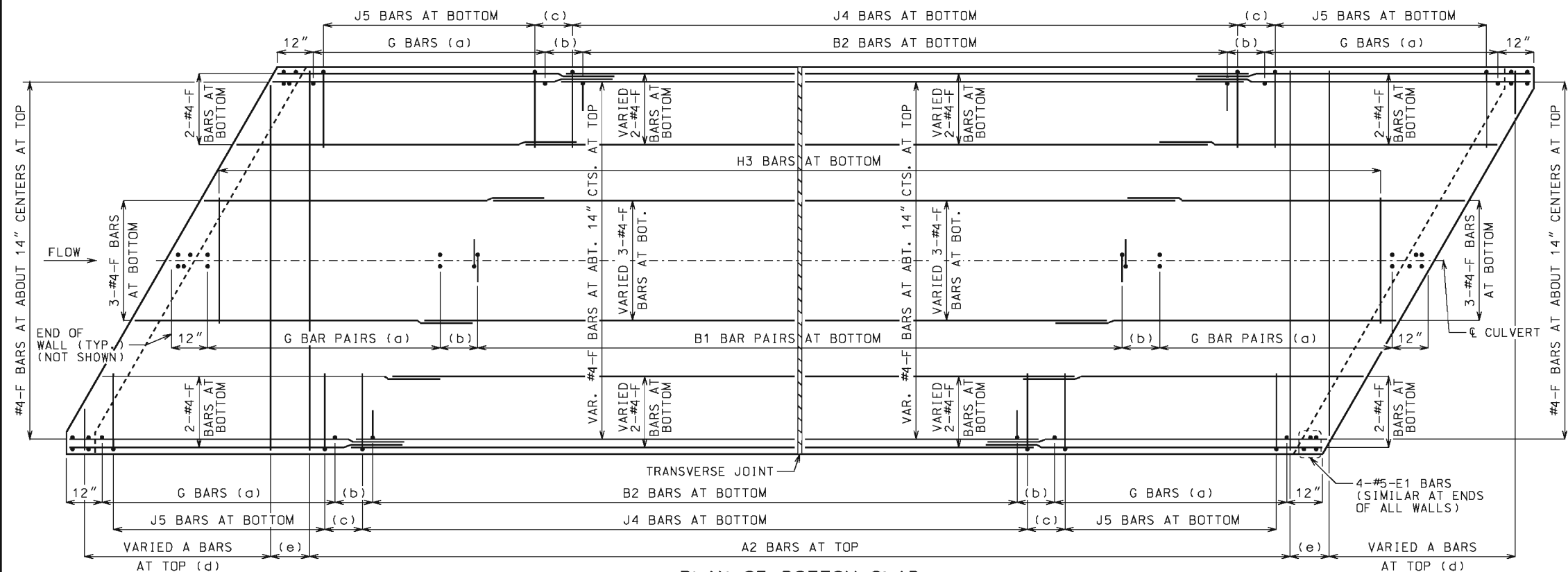
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

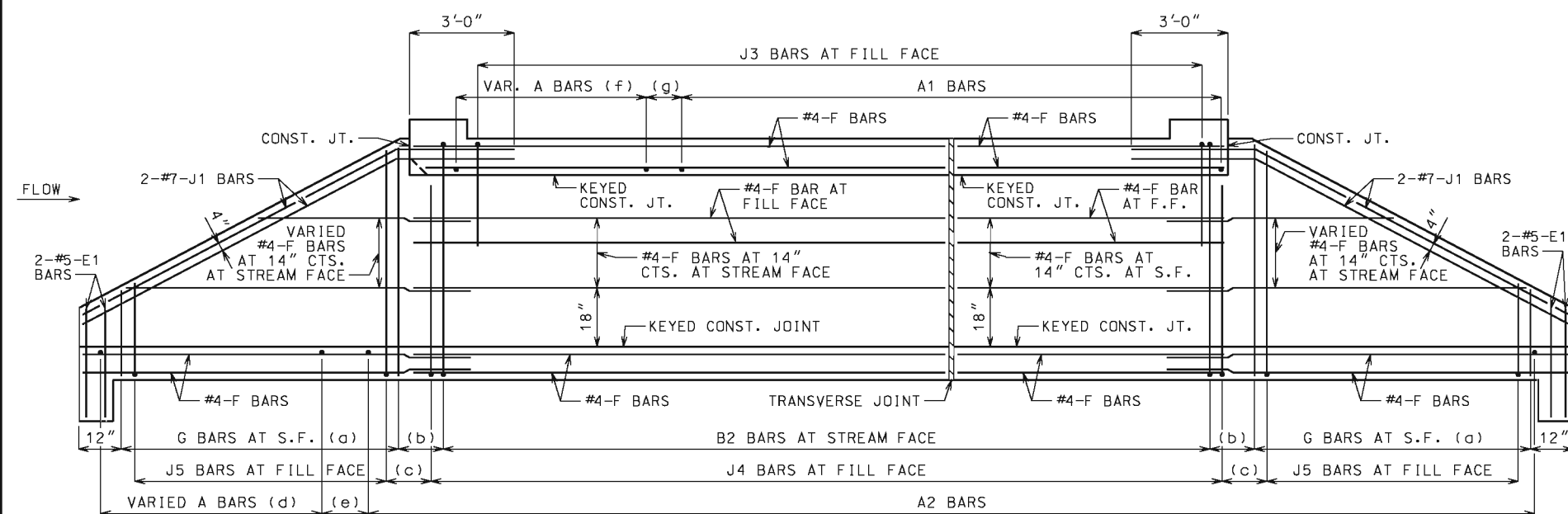
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

| | |
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|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: FLARED SECTIONS |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.43H |
| SHEET NO. 3 OF 3 | |



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM



(c) J4 BAR SPACING

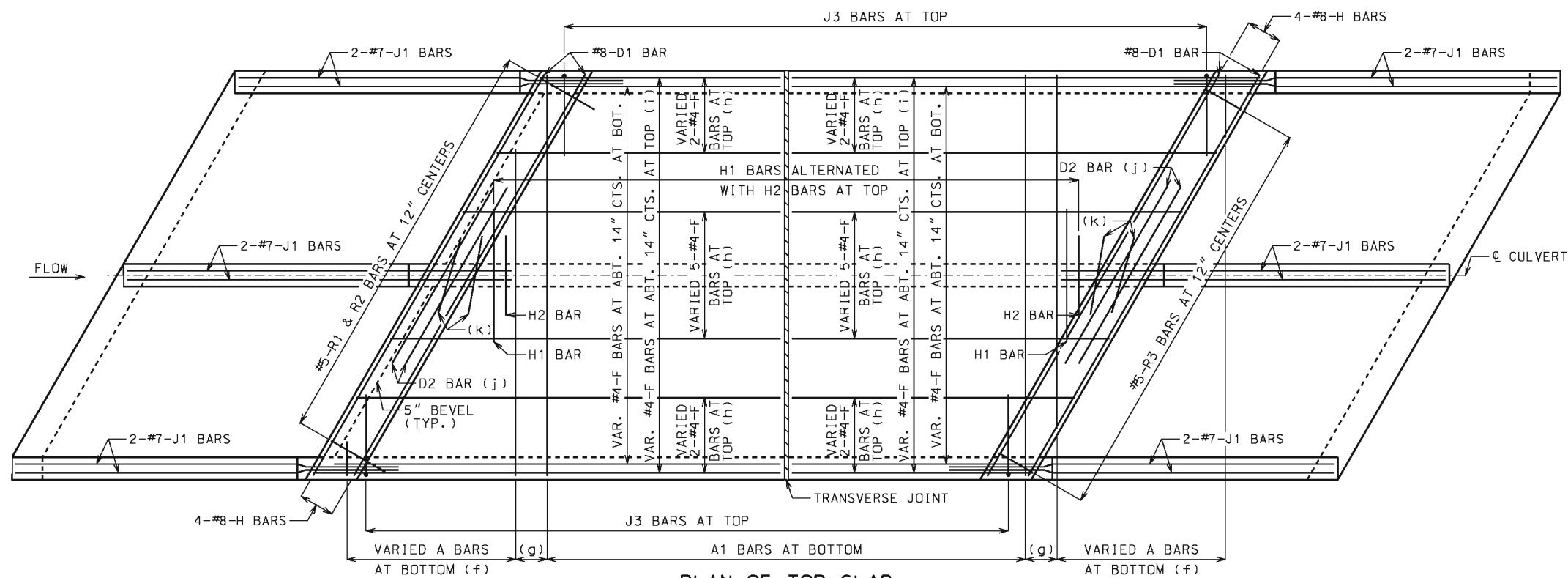
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

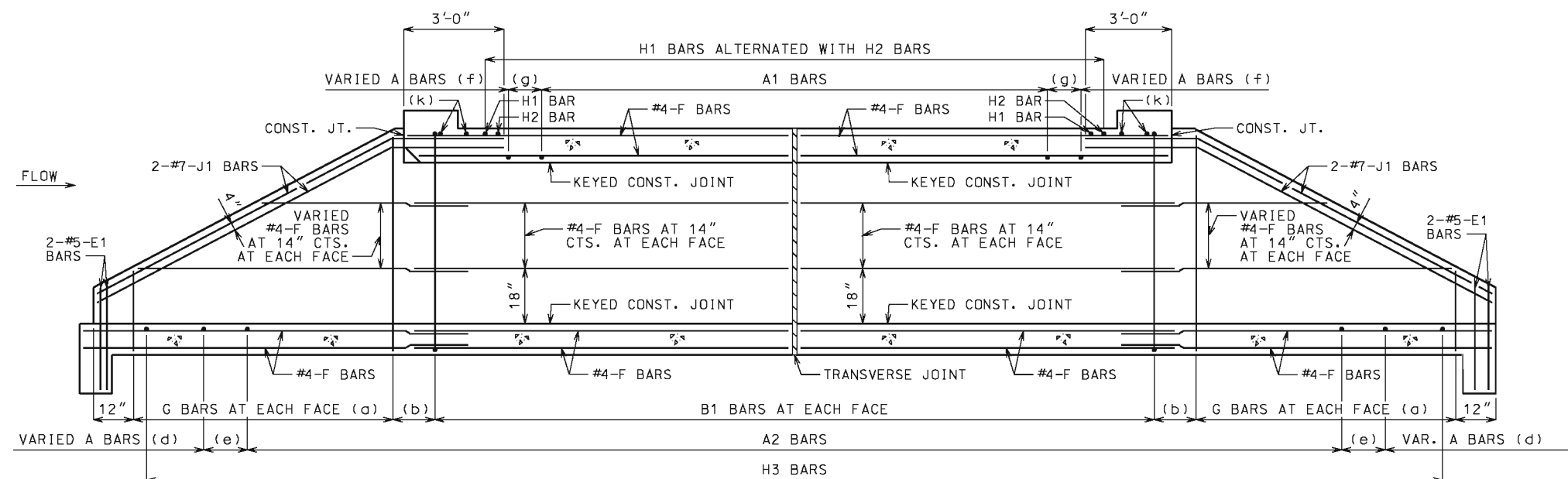
(g) A1 BAR SPACING

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.44H |
| SHEET NO. 1 OF 3 | |



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3.
FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS


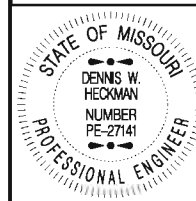
(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

#8 FOR CLEAR SPAN $> 10'-0"$

#9 FOR CLEAR SPAN $> 13'-0"$

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN.
THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

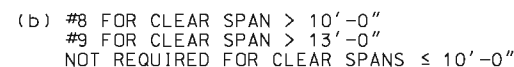
(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.44H |
| SHEET NO. 2 OF 3 | |



PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



GENERAL NOTES:

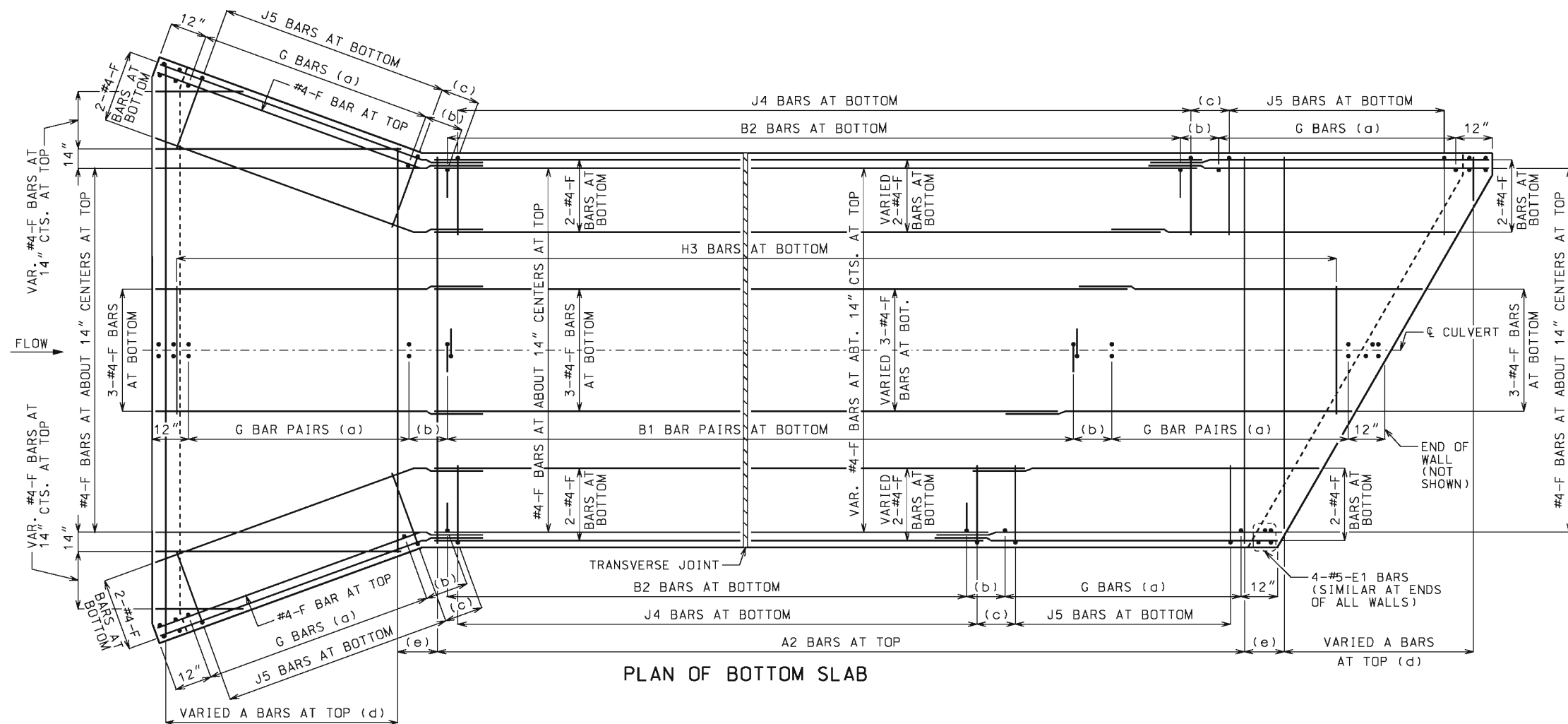
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

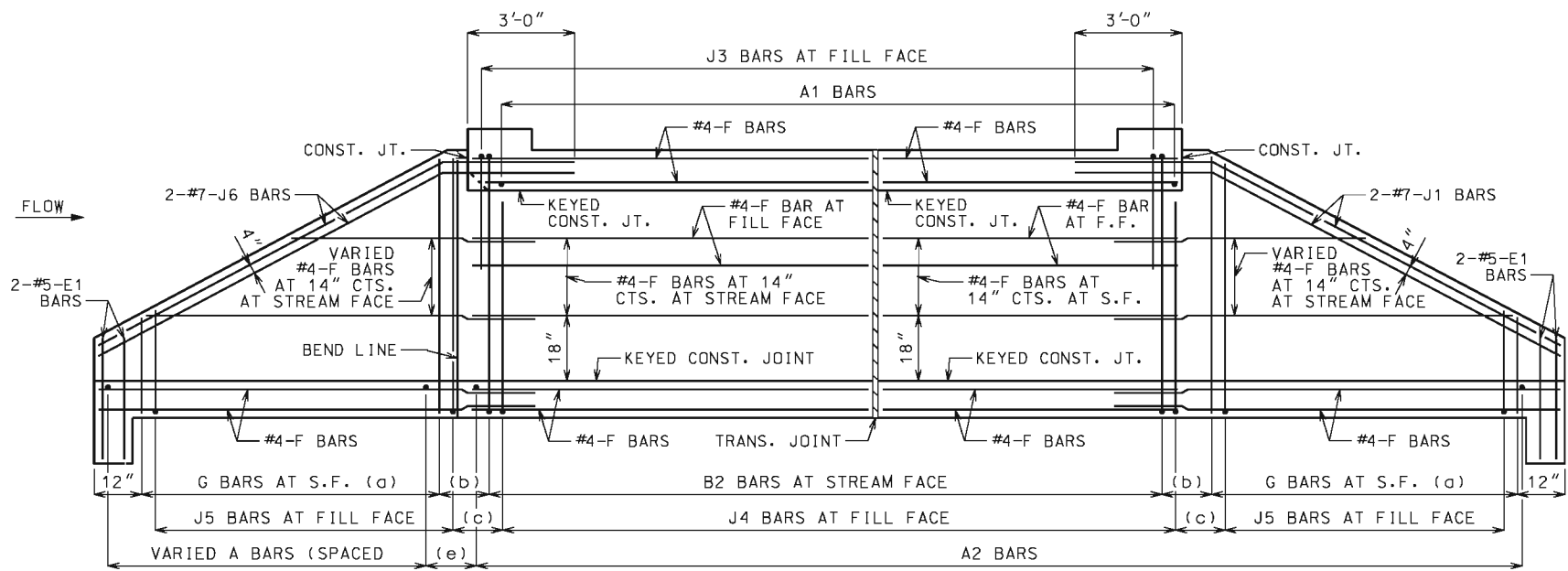
DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".





PLAN OF BOTTOM SLAB



DEVELOPED ELEVATION OF EXTERIOR WALL
J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANSVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.46.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

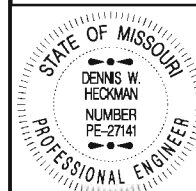
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

CONCRETE
DOUBLE BOX CULVERT

SKEW: RIGHT ADVANCE
WINGS: FLARED

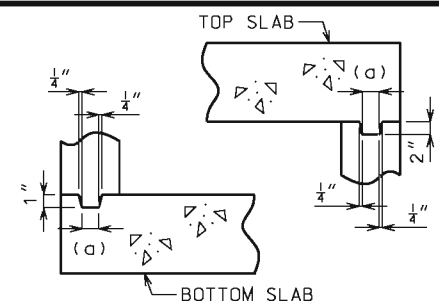
REINFORCEMENT

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 5/13/2015

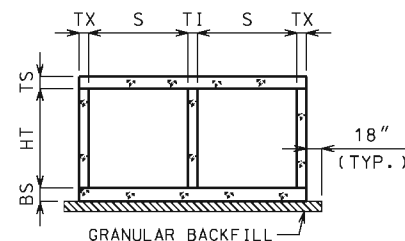
703.45C

SHEET NO.
1 OF 3

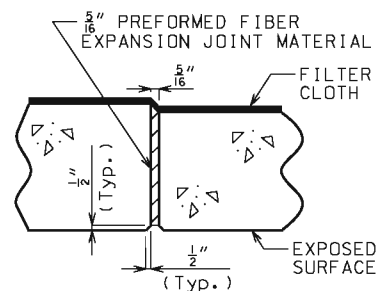
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



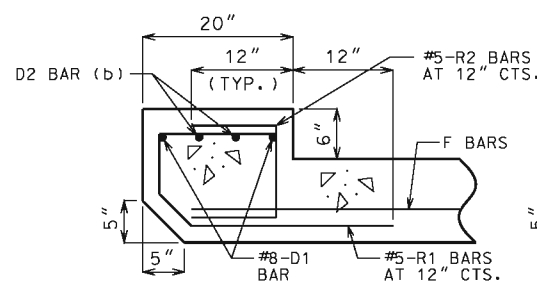
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



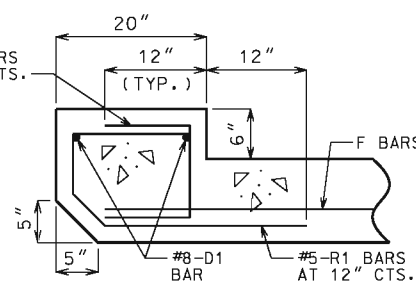
TRANSVERSE JOINT THRU BARREL

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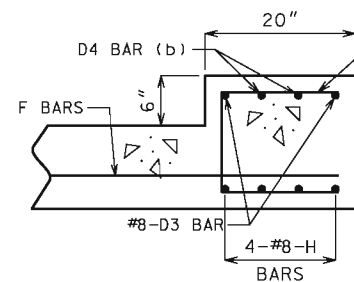
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



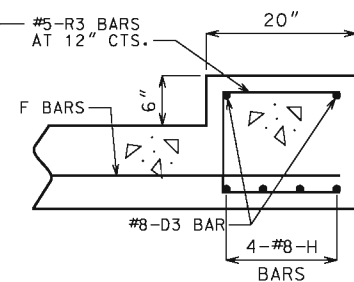
UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



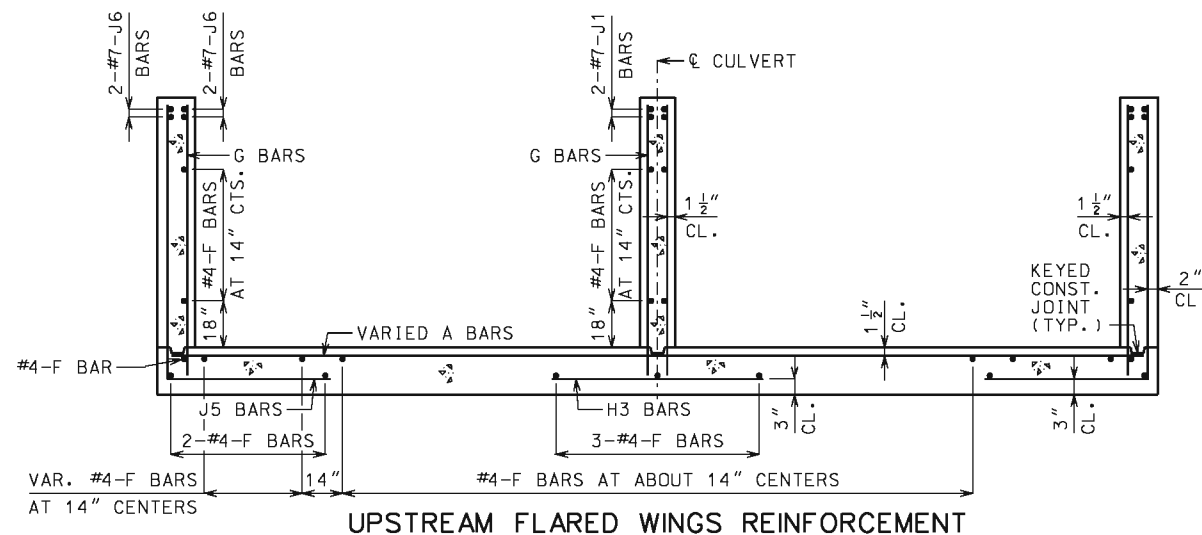
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL



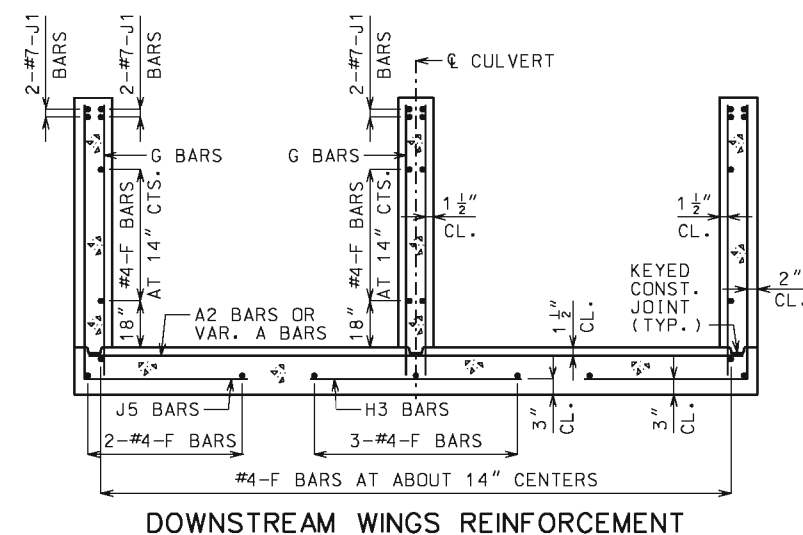
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) #8 FOR CLEAR SPAN > 10'-0"
#9 FOR CLEAR SPAN > 13'-0"
NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0"

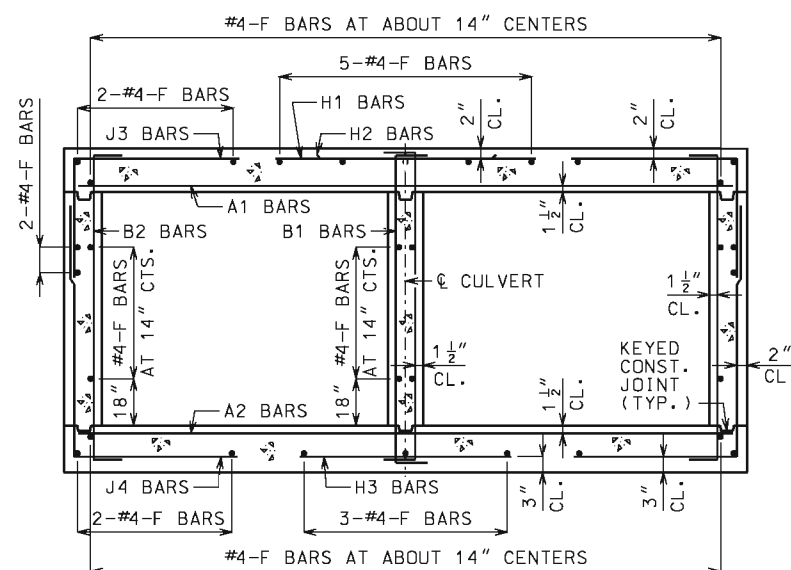
IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



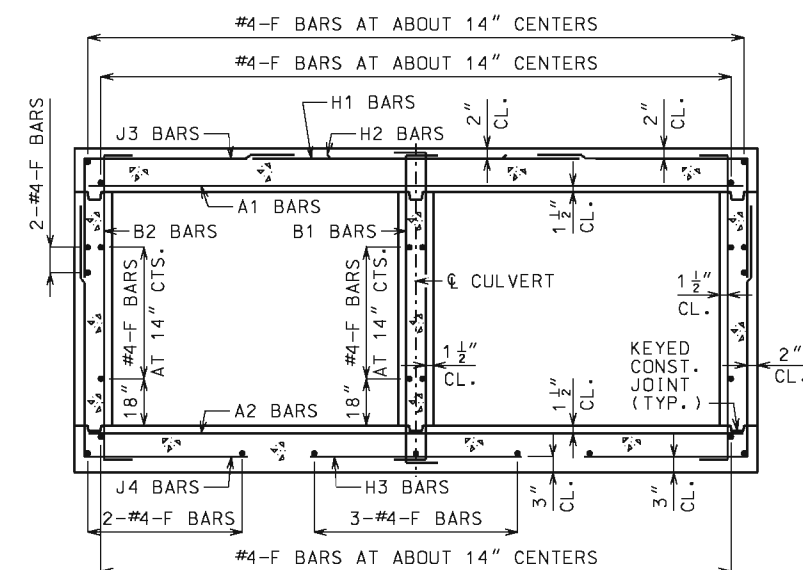
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

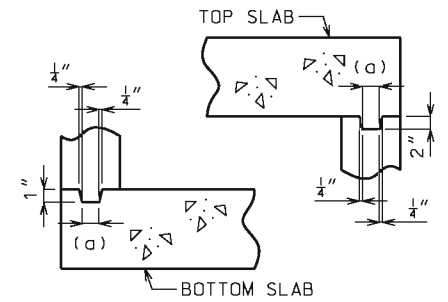
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.47. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

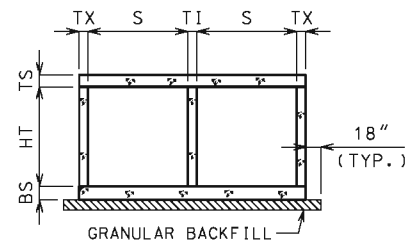
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

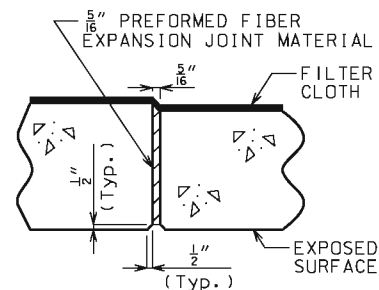
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE DOUBLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: FLARED SECTIONS |
| DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.45C |
| SHEET NO. 3 OF 3 | |



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



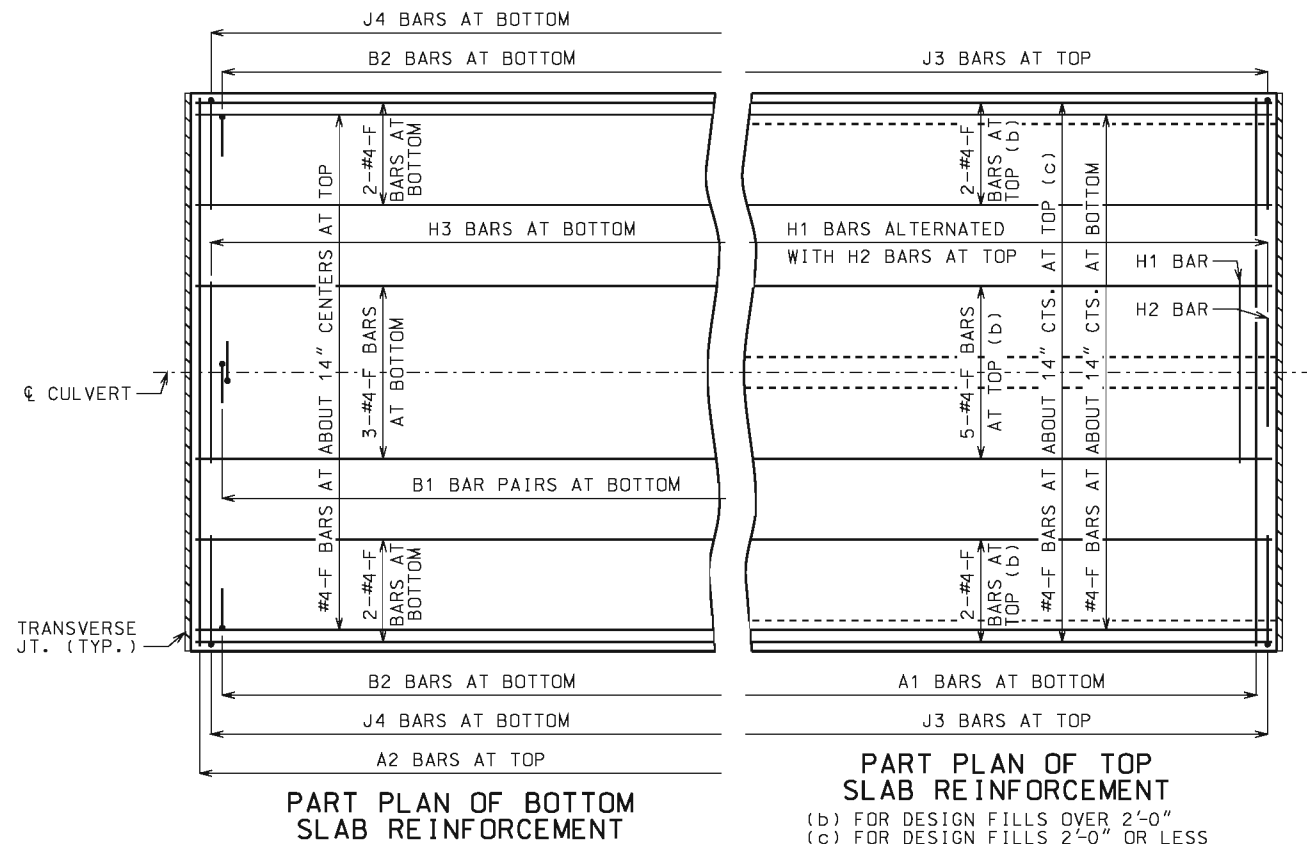
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



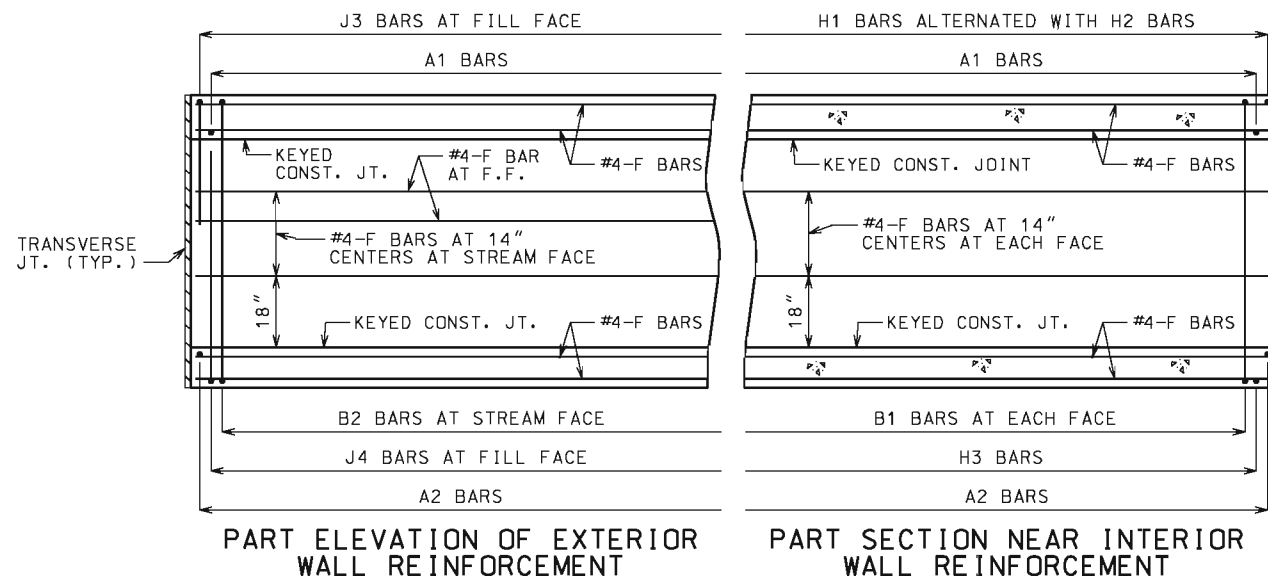
TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



PART PLAN OF TOP SLAB REINFORCEMENT
(b) FOR DESIGN FILLS OVER 2'-0"
(c) FOR DESIGN FILLS 2'-0" OR LESS



GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

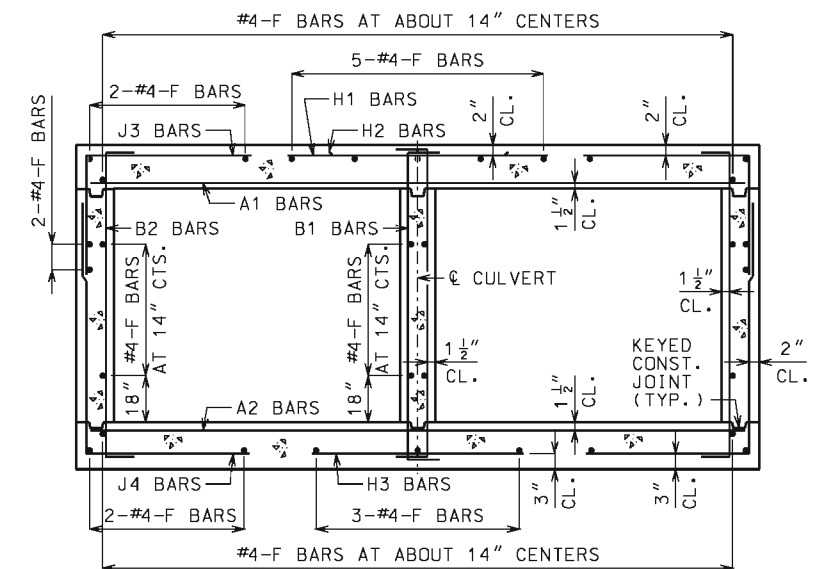
DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.47.

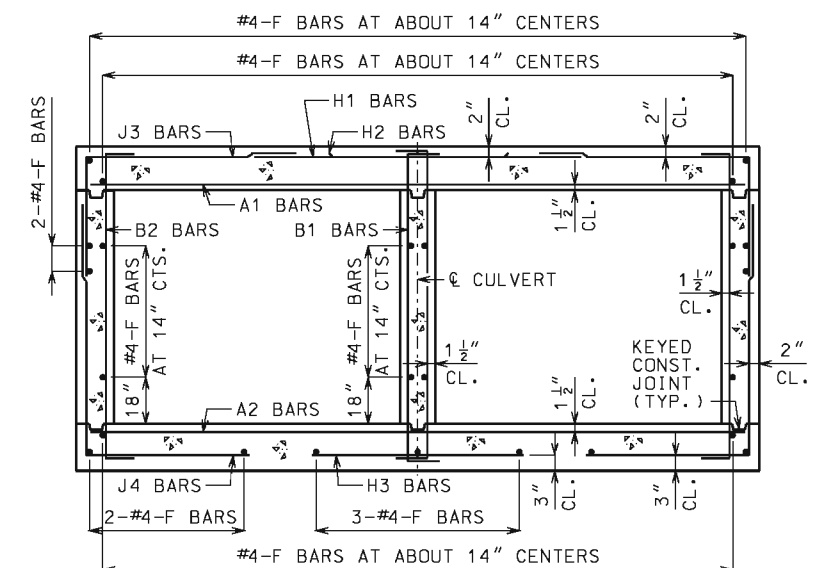
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.


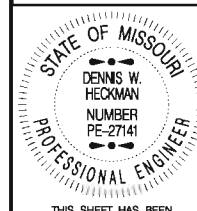
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS
SYMMETRICAL ABOUT AND NORMAL TO CULVERT.

| | | |
|--|--|-----------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| CONCRETE DOUBLE BOX CULVERT CUT SECTION | | |
|  | DATE EFFECTIVE: 10/01/2011 DATE PREPARED: 5/13/2015 | 703.46 SHEET NO. 1 OF 1 |

| SPAN (S) = 3 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 2 FT OR 3 FT OR 4 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|---------|------|---------|------|------------------|------|------|------|---------|-------|-------|---------|------|---------|----|------|-----------|------|------|----|------------------------------------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=2' | HT=3' | HT=4' | | | | | | | | | | HT=2' | HT=3' | HT=4' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 23.8 | 26.0 | 26.0 | 26.0 | 4 | 24 | 39.5 | 4 | 24 | 16.0 | 4 | 12 | 4 | 12 | 35.3 | 28 | 40 | 52 | 4 | 12 | 24.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 9 | 4 | 10.5 | 23.8 | 26.0 | 26.0 | 26.0 | 4 | 24 | 39.5 | 4 | 24 | 16.0 | 4 | 12 | 4 | 12 | 33.0 | 28 | 40 | 52 | 4 | 12 | 24.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 23.8 | 24.0 | 24.0 | 24.0 | 4 | 24 | 39.5 | 4 | 24 | 15.5 | 4 | 12 | 4 | 12 | 30.1 | 28 | 40 | 52 | 4 | 12 | 23.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 30.0 | 24.0 | 24.0 | 24.0 | 4 | 24 | 24.5 | 4 | 24 | 15.0 | 4 | 12 | 4 | 12 | 28.0 | 28 | 40 | 52 | 4 | 12 | 23.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 28.0 | 24.0 | 24.0 | 24.0 | 4 | 24 | 23.5 | 4 | 24 | 15.0 | 4 | 12 | 4 | 12 | 27.0 | 28 | 40 | 52 | 4 | 12 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 25.0 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 14.5 | 4 | 12 | 4 | 12 | 24.6 | 28 | 40 | 52 | 4 | 12 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.9 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 15.5 | 4 | 12 | 4 | 12 | 24.5 | 28 | 40 | 52 | 4 | 12 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.8 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 16.0 | 4 | 12 | 4 | 12 | 24.5 | 28 | 40 | 52 | 4 | 11.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.6 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 17.0 | 4 | 12 | 4 | 12 | 24.4 | 28 | 40 | 52 | 4 | 10.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.6 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 17.5 | 4 | 12 | 4 | 12 | 24.4 | 28 | 40 | 52 | 4 | 10 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 17.5 | 4 | 12 | 4 | 12 | 24.3 | 28 | 40 | 52 | 4 | 9.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 22 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 18.0 | 4 | 12 | 4 | 12 | 24.3 | 28 | 40 | 52 | 4 | 9 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 24 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 18.0 | 4 | 12 | 4 | 12 | 24.3 | 28 | 40 | 52 | 4 | 8.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 26 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 4 | 24 | 18.0 | 4 | 11 | 4 | 11 | 24.3 | 28 | 40 | 52 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 28 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 24.4 | 24.0 | 24.0 | 24.0 | 4 | 23 | 22.0 | 4 | 23 | 18.0 | 4 | 10.5 | 4 | 10.5 | 24.1 | 28 | 40 | 52 | 4 | 7.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 30 FT | 8 | 8 | 8 | 8 | 4 | 11.5 | 4 | 10.5 | 24.4 | 24.0 | 24.0 | 24.0 | 4 | 22 | 22.0 | 4 | 22 | 18.0 | 4 | 9 | 4 | 9.5 | 24.1 | 28 | 40 | 52 | 4 | 7.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 32 FT | 8 | 9 | 8 | 8 | 4 | 11 | 4 | 9.5 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 21 | 22.0 | 4 | 21 | 18.0 | 4 | 10.5 | 4 | 12 | 24.5 | 29 | 41 | 53 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 34 FT | 8 | 9 | 8 | 8 | 4 | 10.5 | 4 | 9 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 20 | 22.0 | 4 | 20 | 18.0 | 4 | 9.5 | 4 | 11.5 | 24.4 | 29 | 41 | 53 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 36 FT | 8 | 9 | 8 | 8 | 4 | 10 | 4 | 8.5 | 24.4 | 24.0 | 24.0 | 24.0 | 4 | 19 | 22.0 | 4 | 19 | 18.0 | 4 | 9 | 4 | 11 | 24.4 | 29 | 41 | 53 | 4 | 7.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 38 FT | 8 | 10 | 8 | 8 | 4 | 9.5 | 4 | 8 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 18 | 22.0 | 4 | 18 | 17.5 | 4 | 10 | 4 | 12 | 24.8 | 30 | 42 | 54 | 4 | 8.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 40 FT | 8 | 10 | 8 | 8 | 4 | 9 | 4 | 7.5 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 17 | 22.0 | 4 | 17 | 17.5 | 4 | 9.5 | 4 | 12 | 24.8 | 30 | 42 | 54 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 42 FT | 9 | 10 | 8 | 8 | 4 | 9 | 4 | 9 | 24.6 | 25.0 | 25.0 | 25.0 | 4 | 19 | 22.0 | 4 | 19 | 17.5 | 4 | 9 | 4 | 11.5 | 24.8 | 30 | 42 | 54 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 44 FT | 9 | 10 | 8 | 8 | 4 | 9 | 4 | 8.5 | 24.6 | 25.0 | 25.0 | 25.0 | 4 | 18 | 22.0 | 4 | 18 | 17.5 | 4 | 8.5 | 4 | 11 | 24.8 | 30 | 42 | 54 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 46 FT | 9 | 11 | 8 | 8 | 4 | 8.5 | 4 | 8 | 24.8 | 25.0 | 25.0 | 25.0 | 4 | 18 | 22.0 | 4 | 18 | 17.5 | 4 | 9 | 4 | 10.5 | 25.0 | 31 | 43 | 55 | 4 | 8.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 48 FT | 9 | 11 | 8 | 8 | 4 | 8 | 4 | 7.5 | 24.8 | 25.0 | 25.0 | 25.0 | 4 | 17 | 22.0 | 4 | 17 | 17.5 | 4 | 8.5 | 4 | 10.5 | 25.0 | 31 | 43 | 55 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |
| 50 FT | 10 | 11 | 8 | 8 | 4 | 8.5 | 4 | 8 | 24.9 | 26.0 | 26.0 | 26.0 | 4 | 19 | 21.5 | 4 | 19 | 17.5 | 4 | 8.5 | 4 | 10.5 | 25.1 | 31 | 43 | 55 | 4 | 8 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | |

| SPAN (S) = 3 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|------------------|----|---------|-------|------|------|---------|------|------|----------------------------|---------|----|---------|----|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 23.8 | 26.0 | 26.0 | 4 | 24 | 39.5 | 4 | 24 | 16.0 | 4 | 12 | 4 | 11.5 | 39.0 | 64 | 76 | 4 | 12 | 24.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 23.8 | 26.0 | 26.0 | 4 | 24 | 39.5 | 4 | 24 | 16.0 | 4 | 12 | 4 | 11 | 39.9 | 64 | 76 | 4 | 11.5 | 24.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 23.8 | 24.0 | 24.0 | 4 | 24 | 39.5 | 4 | 24 | 15.0 | 4 | 12 | 4 | 10 | 38.6 | 64 | 76 | 4 | 12 | 23.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 36.9 | 24.0 | 24.0 | 4 | 24 | 25.0 | 4 | 24 | 14.5 | 4 | 12 | 4 | 9.5 | 36.9 | 64 | 76 | 4 | 12 | 23.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 38.6 | 24.0 | 24.0 | 4 | 24 | 23.5 | 4 | 24 | 15.0 | 4 | 12 | 4 | 9 | 35.8 | 64 | 76 | 4 | 12 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 33.1 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 14.0 | 4 | 12 | 4 | 9.5 | 32.8 | 64 | 76 | 4 | 12 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 32.8 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 15.0 | 4 | 12 | 4 | 9 | 32.5 | 64 | 76 | 4 | 12 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 32.4 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 16.0 | 4 | 12 | 4 | 8.5 | 32.3 | 64 | 76 | 4 | 12 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 10 | 32.1 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 16.5 | 4 | 12 | 4 | 8 | 32.1 | 64 | 76 | 4 | 11.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 9 | 32.0 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 17.0 | 4 | 12 | 4 | 7.5 | 32.0 | 64 | 76 | 4 | 11 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 8 | 31.8 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 17.0 | 4 | 12 | 4 | 7 | 31.9 | 64 | 76 | 4 | 10 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 7.5 | 31.6 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 17.5 | 4 | 12 | 4 | 6.5 | 31.8 | 64 | 76 | 4 | 9.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 7 | 31.6 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 17.5 | 4 | 12 | 4 | 6 | 31.6 | 64 | 76 | 4 | 9.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 6.5 | 31.5 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 17.5 | 4 | 11.5 | 5 | 6.5 | 31.6 | 64 | 76 | 4 | 9 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 6 | 31.5 | 24.0 | 24.0 | 4 | 24 | 21.5 | 4 | 24 | 17.5 | 4 | 10.5 | 5 | 6 | 31.5 | 64 | 76 | 4 | 8.5 | 22.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 8 | 9 | 8 | 8 | 4 | 12 | 5 | 6.5 | 31.3 | 24.0 | 28.0 | 4 | 24 | 21.5 | 4 | 24 | 17.5 | 4 | 11.5 | 5 | 6.5 | 32.8 | 65 | 77 | 4 | 10 | 22.5 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 8 | 9 | 8 | 8 | 4 | 11 | 5 | 6 | 31.3 | 24.0 | 28.0 | 4 | 24 | 21.5 | 4 | 24 | 17.5 | 4 | 11 | 5 | 6 | 32.6 | 65 | 77 | 4 | 9.5 | 22.5 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 8 | 9 | 8 | 8 | 4 | 10.5 | 5 | 6 | 31.3 | 24.0 | 28.0 | 4 | 23 | 21.5 | 4 | 23 | 17.5 | 4 | 10 | 5 | 6 | 32.6 | 65 | 77 | 4 | 9 | 22.5 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 8 | 10 | 8 | 8 | 4 | 10 | 6 | 7.5 | 34.1 | 24.0 | 28.0 | 4 | 22 | 21.5 | 4 | 22 | 17.5 | 4 | 11 | 5 | 6 | 33.5 | 66 | 78 | 4 | 10.5 | 22.5 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 8 | 10 | 8 | 8 | 4 | 9.5 | 6 | 7.5 | 34.1 | 24.0 | 28.0 | 4 | 21 | 21.5 | 4 | 21 | 17.5 | 4 | 10.5 | 5 | 6 | 33.5 | 66 | 78 | 4 | 10 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 9 | 10 | 8 | 8 | 4 | 10 | 5 | 6 | 31.9 | 25.0 | 29.0 | 4 | 24 | 21.0 | 4 | 24 | 17.5 | 4 | 10 | 6 | 7 | 36.4 | 66 | 78 | 4 | 9.5 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 9 | 10 | 8 | 8 | 4 | 9.5 | 5 | 6 | 31.9 | 25.0 | 29.0 | 4 | 23 | 21.0 | 4 | 23 | 17.5 | 4 | 9.5 | 6 | 7 | 36.3 | 66 | 78 | 4 | 9 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 9 | 10 | 8 | 8 | 4 | 9 | 6 | 7 | 34.9 | 25.0 | 33.0 | 4 | 22 | 21.0 | 4 | 22 | 17.5 | 4 | 9 | 6 | 6.5 | 36.3 | 66 | 78 | 4 | 8.5 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 10 | 11 | 8 | 8 | 4 | 9.5 | 5 | 6 | 32.8 | 26.0 | 30.0 | 4 | 24 | 20.5 | 4 | 24 | 17.0 | 4 | 10 | 6 | 7 | 36.9 | 67 | 79 | 4 | 9.5 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 10 | 11 | 8 | 8 | 4 | 9 | 6 | 7 | 35.8 | 26.0 | 34.0 | 4 | 24 | 20.5 | 4 | 24 | 17.5 | 4 | 9.5 | 6 | 6.5 | 36.9 | 67 | 79 | 4 | 9 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 10 | 11 | 8 | 8 | 4 | 8.5 | 6 | 7 | 35.6 | 26.0 | 34.0 | 4 | 24 | 20.5 | 4 | 24 | 17.5 | 4 | 9 | 6 | 6.5 | 36.9 | 67 | 79 | 4 | 9 | 22.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 4 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 2 FT OR 3 FT | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|---------|------|---------|------|------------------|------|------|----|---------|-------|---------|------|---------|------|------|------|-----------|----------------------------|----|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=2' | HT=3' | | | | | | | | | | HT=2' | HT=3' | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 27.3 | 26.0 | 26.0 | 4 | 23 | 48.0 | 4 | 23 | 20.5 | 4 | 12 | 4 | 12 | 29.3 | 28 | 40 | 4 | 9.5 | 28.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 27.3 | 26.0 | 26.0 | 4 | 23 | 48.0 | 4 | 23 | 20.0 | 4 | 12 | 4 | 12 | 27.3 | 28 | 40 | 4 | 9 | 27.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.3 | 24.0 | 24.0 | 4 | 24 | 34.0 | 4 | 24 | 19.0 | 4 | 12 | 4 | 12 | 25.0 | 28 | 40 | 4 | 9.5 | 27.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.8 | 24.0 | 24.0 | 4 | 24 | 28.5 | 4 | 24 | 19.0 | 4 | 12 | 4 | 12 | 24.0 | 28 | 40 | 4 | 9.5 | 26.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.1 | 24.0 | 24.0 | 4 | 24 | 27.0 | 4 | 24 | 19.0 | 4 | 12 | 4 | 12 | 23.4 | 28 | 40 | 4 | 9 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.6 | 24.0 | 24.0 | 4 | 24 | 25.5 | 4 | 24 | 18.5 | 4 | 12 | 4 | 12 | 22.1 | 28 | 40 | 4 | 9 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.5 | 24.0 | 24.0 | 4 | 24 | 25.5 | 4 | 24 | 18.5 | 4 | 12 | 4 | 12 | 22.1 | 28 | 40 | 4 | 8 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.5 | 24.0 | 24.0 | 4 | 22 | 25.5 | 4 | 22 | 18.5 | 4 | 12 | 4 | 12 | 22.1 | 28 | 40 | 4 | 7.5 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.5 | 24.0 | 24.0 | 4 | 20 | 25.5 | 4 | 20 | 18.5 | 4 | 11 | 4 | 12 | 22.1 | 28 | 40 | 4 | 7 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.5 | 24.0 | 24.0 | 4 | 18 | 25.5 | 4 | 18 | 18.5 | 4 | 10 | 4 | 11.5 | 22.0 | 28 | 40 | 4 | 6.5 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 10.5 | 4 | 11.5 | 22.5 | 24.0 | 24.0 | 4 | 17 | 25.5 | 4 | 17 | 18.5 | 4 | 9 | 4 | 10.5 | 22.0 | 28 | 40 | 4 | 6 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 8 | 9 | 8 | 8 | 4 | 10 | 4 | 10.5 | 22.6 | 24.0 | 24.0 | 4 | 15 | 25.5 | 4 | 15 | 18.5 | 4 | 9 | 4 | 12 | 21.4 | 29 | 41 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 8 | 9 | 8 | 8 | 4 | 9 | 4 | 9.5 | 22.6 | 24.0 | 24.0 | 4 | 14 | 25.5 | 4 | 14 | 18.5 | 4 | 8.5 | 4 | 12 | 21.4 | 29 | 41 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 8 | 10 | 8 | 8 | 4 | 8.5 | 4 | 8.5 | 22.8 | 24.0 | 24.0 | 4 | 13 | 25.5 | 4 | 13 | 18.5 | 4 | 8.5 | 4 | 12 | 20.9 | 30 | 42 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 8 | 10 | 8 | 8 | 4 | 7.5 | 4 | 8 | 22.8 | 24.0 | 24.0 | 4 | 12 | 25.5 | 4 | 12 | 18.5 | 4 | 8 | 4 | 12 | 20.9 | 30 | 42 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 9 | 10 | 8 | 8 | 4 | 8 | 4 | 10.5 | 22.3 | 25.0 | 25.0 | 4 | 13 | 25.5 | 4 | 13 | 18.5 | 4 | 7.5 | 4 | 12 | 21.0 | 30 | 42 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 9 | 11 | 8 | 8 | 4 | 7.5 | 4 | 10 | 22.4 | 25.0 | 25.0 | 4 | 12 | 25.5 | 4 | 12 | 18.5 | 4 | 8 | 4 | 10.5 | 20.6 | 31 | 43 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 10 | 11 | 8 | 8 | 4 | 7.5 | 4 | 10.5 | 22.0 | 26.0 | 26.0 | 4 | 13 | 25.0 | 4 | 13 | 18.5 | 4 | 7.5 | 4 | 10.5 | 20.9 | 31 | 43 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 36 FT | 10 | 12 | 8 | 8 | 4 | 7.5 | 4 | 10 | 22.1 | 26.0 | 26.0 | 4 | 12 | 25.0 | 4 | 12 | 18.5 | 4 | 7.5 | 4 | 9.5 | 20.6 | 32 | 44 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 38 FT | 10 | 12 | 8 | 8 | 4 | 7 | 4 | 9.5 | 22.1 | 26.0 | 26.0 | 4 | 12 | 25.0 | 4 | 12 | 18.5 | 4 | 7.5 | 4 | 9.5 | 20.6 | 32 | 44 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 40 FT | 11 | 12 | 8 | 8 | 4 | 7 | 4 | 9.5 | 21.8 | 27.0 | 27.0 | 4 | 13 | 25.0 | 4 | 13 | 18.5 | 4 | 7 | 4 | 9.5 | 20.9 | 32 | 44 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 42 FT | 11 | 13 | 8 | 8 | 4 | 6.5 | 4 | 9.5 | 21.9 | 27.0 | 27.0 | 4 | 12 | 25.0 | 4 | 12 | 18.5 | 4 | 7 | 4 | 8.5 | 20.6 | 33 | 45 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 44 FT | 11 | 13 | 8 | 8 | 4 | 6.5 | 4 | 9 | 21.9 | 27.0 | 27.0 | 4 | 12 | 25.0 | 4 | 12 | 18.5 | 4 | 7 | 4 | 8.5 | 20.6 | 33 | 45 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 46 FT | 12 | 13 | 8 | 8 | 4 | 6.5 | 4 | 8.5 | 21.6 | 28.0 | 28.0 | 4 | 12 | 24.5 | 4 | 12 | 18.5 | 4 | 6.5 | 4 | 8.5 | 20.9 | 33 | 45 | 5 | 8.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 48 FT | 12 | 13 | 8 | 8 | 4 | 6.5 | 4 | 8.5 | 21.6 | 28.0 | 28.0 | 4 | 12 | 24.5 | 4 | 12 | 18.5 | 4 | 6 | 4 | 8.5 | 20.9 | 33 | 45 | 5 | 8.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 50 FT | 12 | 14 | 8 | 8 | 4 | 6 | 4 | 8.5 | 21.8 | 28.0 | 28.0 | 4 | 12 | 24.5 | 4 | 12 | 18.5 | 4 | 6.5 | 4 | 7.5 | 20.8 | 34 | 46 | 5 | 9 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |

| SPAN (S) = 4 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|---------|------|------------------|----|-------|-------|---------|------|---------|------|---------|------|----------------------------|----|------|----|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=4' | HT=5' | | | | | | | | | | HT=4' | HT=5' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 27.3 | 26.0 | 26.0 | 4 | 23 | 48.0 | 4 | 23 | 20.5 | 4 | 12 | 4 | 12 | 39.9 | 52 | 64 | 4 | 9 | 28.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 27.3 | 26.0 | 26.0 | 4 | 23 | 48.0 | 4 | 23 | 20.5 | 4 | 12 | 4 | 12 | 36.8 | 52 | 64 | 4 | 9 | 27.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.3 | 24.0 | 24.0 | 4 | 24 | 48.0 | 4 | 24 | 19.5 | 4 | 12 | 4 | 12 | 33.8 | 52 | 64 | 4 | 9 | 27.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 33.5 | 24.0 | 24.0 | 4 | 24 | 28.5 | 4 | 24 | 19.0 | 4 | 12 | 4 | 11.5 | 31.3 | 52 | 64 | 4 | 9 | 26.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 30.6 | 24.0 | 24.0 | 4 | 24 | 27.0 | 4 | 24 | 19.0 | 4 | 12 | 4 | 11 | 29.9 | 52 | 64 | 4 | 8.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.4 | 24.0 | 24.0 | 4 | 24 | 25.5 | 4 | 24 | 18.5 | 4 | 12 | 4 | 12 | 27.1 | 52 | 64 | 4 | 9 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.1 | 24.0 | 24.0 | 4 | 24 | 25.5 | 4 | 24 | 18.5 | 4 | 12 | 4 | 11 | 26.9 | 52 | 64 | 4 | 8 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.0 | 24.0 | 24.0 | 4 | 22 | 25.0 | 4 | 22 | 18.5 | 4 | 12 | 4 | 10.5 | 26.8 | 52 | 64 | 4 | 7.5 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 26.9 | 24.0 | 24.0 | 4 | 21 | 25.0 | 4 | 21 | 18.5 | 4 | 10.5 | 4 | 10 | 26.6 | 52 | 64 | 4 | 7 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 11.5 | 4 | 10 | 26.8 | 24.0 | 24.0 | 4 | 19 | 25.0 | 4 | 19 | 18.5 | 4 | 9.5 | 4 | 9 | 26.6 | 52 | 64 | 4 | 6.5 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 10.5 | 4 | 9 | 26.6 | 24.0 | 24.0 | 4 | 17 | 25.0 | 4 | 17 | 18.5 | 4 | 8.5 | 4 | 8 | 26.5 | 52 | 64 | 4 | 6 | 25.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 8 | 9 | 8 | 8 | 4 | 9.5 | 4 | 8 | 26.8 | 24.0 | 24.0 | 4 | 15 | 25.0 | 4 | 15 | 18.5 | 4 | 9 | 4 | 9.5 | 26.8 | 53 | 65 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 8 | 9 | 8 | 8 | 4 | 9 | 4 | 7.5 | 26.6 | 24.0 | 24.0 | 4 | 14 | 25.0 | 4 | 14 | 18.5 | 4 | 8.5 | 4 | 9 | 26.6 | 53 | 65 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 8 | 10 | 8 | 8 | 4 | 8.5 | 4 | 6.5 | 26.6 | 24.0 | 24.0 | 4 | 13 | 25.0 | 4 | 13 | 18.5 | 4 | 8.5 | 4 | 10.5 | 26.9 | 54 | 66 | 4 | 7 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 8 | 10 | 8 | 8 | 4 | 7.5 | 4 | 6 | 26.6 | 24.0 | 24.0 | 4 | 12 | 25.0 | 4 | 12 | 18.5 | 4 | 8 | 4 | 10 | 26.9 | 54 | 66 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 9 | 10 | 8 | 8 | 4 | 8 | 4 | 7.5 | 26.8 | 25.0 | 25.0 | 4 | 13 | 25.0 | 4 | 13 | 18.5 | 4 | 7 | 4 | 9 | 26.9 | 54 | 66 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 9 | 11 | 8 | 8 | 4 | 7.5 | 4 | 6.5 | 26.9 | 25.0 | 25.0 | 4 | 12 | 25.0 | 4 | 12 | 18.5 | 4 | 8 | 4 | 9 | 27.1 | 55 | 67 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 10 | 11 | 8 | 8 | 4 | 7.5 | 4 | 6.5 | 27.0 | 26.0 | 26.0 | 4 | 14 | 24.5 | 4 | 14 | 18.5 | 4 | 7.5 | 4 | 8.5 | 27.1 | 55 | 67 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 10 | 12 | 8 | 8 | 4 | 7.5 | 4 | 6.5 | 27.1 | 26.0 | 26.0 | 4 | 13 | 24.5 | 4 | 13 | 18.5 | 4 | 8 | 4 | 8.5 | 27.4 | 56 | 68 | 4 | 6.5 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 10 | 12 | 8 | 8 | 4 | 7 | 4 | 6 | 27.1 | 26.0 | 26.0 | 4 | 12 | 24.5 | 4 | 12 | 18.5 | 4 | 7.5 | 4 | 8 | 27.4 | 56 | 68 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 11 | 12 | 8 | 8 | 4 | 7 | 4 | 6 | 27.3 | 27.0 | 27.0 | 4 | 14 | 24.5 | 4 | 14 | 18.5 | 4 | 7 | 4 | 7.5 | 27.5 | 56 | 68 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 11 | 13 | 8 | 8 | 4 | 7 | 5 | 9 | 27.3 | 27.0 | 27.0 | 4 | 13 | 24.5 | 4 | 13 | 18.5 | 4 | 7.5 | 4 | 7.5 | 27.8 | 57 | 69 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 11 | 13 | 8 | 8 | 4 | 6.5 | 5 | 8.5 | 27.3 | 27.0 | 27.0 | 4 | 12 | 24.5 | 4 | 12 | 18.5 | 4 | 7 | 4 | 7.5 | 27.6 | 57 | 69 | 4 | 6 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 11 | 13 | 8 | 8 | 4 | 6 | 5 | 8.5 | 27.3 | 27.0 | 27.0 | 4 | 12 | 24.5 | 4 | 12 | 18.5 | 4 | 6.5 | 4 | 7 | 27.6 | 57 | 69 | 5 | 9 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 12 | 13 | 8 | 8 | 4 | 6.5 | 5 | 8.5 | 27.4 | 28.0 | 28.0 | 4 | 13 | 24.0 | 4 | 13 | 18.5 | 4 | 6.5 | 4 | 6.5 | 27.8 | 57 | 69 | 5 | 8.5 | 26.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 12 | 14 | 8 | 8 | 4 | 6 | 5 | 8.5 | 27.5 | 28.0 | 28.0 | 4 | 13 | 23.5 | 4 | 13 | 18.0 | 4 | 7 | 4 | 6.5 | 28.0 | 58 | 70 | 4 | 6 | 25.5 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 3 FT OR 4 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|---------|------|---------|------|---------|------|------------------|----|---------|-------|---------|------|---------|------|------|------|----------------------------|----|----|----|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=3' | HT=4' | | | | | | | | | | HT=3' | HT=4' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 4 | 6.5 | 4 | 9.5 | 30.9 | 27.0 | 27.0 | 4 | 20 | 56.0 | 4 | 20 | 21.5 | 4 | 12 | 4 | 12 | 33.3 | 40 | 52 | 4 | 7.5 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 4 | 6.5 | 4 | 9.5 | 30.9 | 27.0 | 27.0 | 4 | 19 | 56.0 | 4 | 19 | 21.5 | 4 | 11.5 | 4 | 11.5 | 31.0 | 40 | 52 | 4 | 7 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 11 | 4 | 12 | 30.0 | 24.0 | 24.0 | 4 | 18 | 39.0 | 4 | 18 | 20.0 | 4 | 12 | 4 | 12 | 28.4 | 40 | 52 | 4 | 7 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.4 | 24.0 | 24.0 | 4 | 19 | 32.0 | 4 | 19 | 20.0 | 4 | 11.5 | 4 | 12 | 26.9 | 40 | 52 | 4 | 7 | 29.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.6 | 24.0 | 24.0 | 4 | 18 | 30.5 | 4 | 18 | 19.5 | 4 | 10.5 | 4 | 11.5 | 26.0 | 40 | 52 | 4 | 6.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 11 | 4 | 12 | 26.1 | 24.0 | 24.0 | 4 | 16 | 29.5 | 4 | 16 | 19.5 | 4 | 9.5 | 4 | 10.5 | 25.5 | 40 | 52 | 4 | 6 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.6 | 24.0 | 24.0 | 4 | 16 | 28.5 | 4 | 16 | 19.0 | 4 | 9.5 | 4 | 11 | 24.4 | 40 | 52 | 5 | 7.5 | 28.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 10 | 4 | 11 | 24.6 | 24.0 | 24.0 | 4 | 14 | 28.5 | 4 | 14 | 19.0 | 4 | 8.5 | 4 | 10 | 24.3 | 40 | 52 | 5 | 7 | 28.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 8 | 9 | 8 | 8 | 4 | 9 | 4 | 9.5 | 24.8 | 24.0 | 24.0 | 4 | 12 | 28.5 | 4 | 12 | 19.0 | 4 | 8.5 | 4 | 12 | 23.5 | 41 | 53 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 8.5 | 24.8 | 24.0 | 24.0 | 5 | 17 | 28.5 | 5 | 17 | 19.5 | 4 | 7.5 | 4 | 11.5 | 23.5 | 41 | 53 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 8 | 10 | 8 | 8 | 4 | 7.5 | 4 | 7.5 | 24.9 | 24.0 | 24.0 | 5 | 17 | 28.0 | 5 | 17 | 20.0 | 4 | 7.5 | 4 | 12 | 22.9 | 42 | 54 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 9 | 10 | 8 | 8 | 4 | 7 | 4 | 9 | 24.3 | 25.0 | 25.0 | 5 | 16 | 28.5 | 5 | 16 | 19.0 | 4 | 7 | 4 | 12 | 23.1 | 42 | 54 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 4 | 8 | 24.5 | 25.0 | 25.0 | 5 | 16 | 28.5 | 5 | 16 | 20.0 | 4 | 7 | 4 | 10.5 | 22.8 | 43 | 55 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 8 | 8 | 4 | 6.5 | 4 | 8.5 | 24.0 | 26.0 | 26.0 | 5 | 16 | 28.5 | 5 | 16 | 19.0 | 4 | 6.5 | 4 | 10.5 | 23.0 | 43 | 55 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 10 | 12 | 8 | 8 | 4 | 6.5 | 4 | 8 | 24.1 | 26.0 | 26.0 | 5 | 15 | 28.0 | 5 | 15 | 19.5 | 4 | 6.5 | 4 | 9.5 | 22.6 | 44 | 56 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 11 | 12 | 8 | 8 | 4 | 6.5 | 4 | 8.5 | 23.8 | 27.0 | 27.0 | 5 | 15 | 28.0 | 5 | 15 | 19.0 | 4 | 6 | 4 | 9.5 | 22.9 | 44 | 56 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 11 | 13 | 8 | 8 | 4 | 6 | 4 | 7.5 | 23.9 | 27.0 | 27.0 | 5 | 15 | 28.0 | 5 | 15 | 19.0 | 4 | 6.5 | 4 | 8.5 | 22.8 | 45 | 57 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 12 | 13 | 8 | 8 | 4 | 6 | 4 | 8.5 | 23.6 | 28.0 | 28.0 | 5 | 15 | 28.0 | 5 | 15 | 19.0 | 4 | 6 | 4 | 8.5 | 22.9 | 45 | 57 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 12 | 14 | 8 | 8 | 5 | 9 | 4 | 7.5 | 23.8 | 28.0 | 28.0 | 5 | 15 | 28.0 | 5 | 15 | 19.0 | 4 | 6 | 4 | 7.5 | 22.8 | 46 | 58 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 13 | 14 | 8 | 8 | 5 | 9 | 4 | 7.5 | 23.5 | 29.0 | 29.0 | 5 | 15 | 27.5 | 5 | 15 | 19.0 | 4 | 6 | 4 | 7.5 | 23.0 | 46 | 58 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 13 | 15 | 8 | 8 | 5 | 8.5 | 4 | 7.5 | 23.8 | 29.0 | 29.0 | 5 | 15 | 27.5 | 5 | 15 | 19.0 | 4 | 6 | 4 | 7 | 22.9 | 47 | 59 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 13 | 15 | 8 | 8 | 5 | 8 | 4 | 7 | 23.8 | 29.0 | 29.0 | 5 | 14 | 27.5 | 5 | 14 | 19.0 | 5 | 9 | 4 | 7 | 22.9 | 47 | 59 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 14 | 15 | 8 | 8 | 5 | 8.5 | 4 | 7 | 23.5 | 30.0 | 30.0 | 5 | 15 | 27.0 | 5 | 15 | 19.0 | 5 | 8.5 | 4 | 7 | 23.1 | 47 | 59 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 14 | 16 | 8 | 8 | 5 | 8 | 4 | 7 | 23.6 | 30.0 | 30.0 | 5 | 14 | 27.0 | 5 | 14 | 19.0 | 5 | 9 | 4 | 6.5 | 23.1 | 48 | 60 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 14 | 16 | 8 | 8 | 5 | 7.5 | 4 | 6.5 | 23.6 | 30.0 | 30.0 | 5 | 14 | 27.0 | 5 | 14 | 19.0 | 5 | 8.5 | 4 | 6.5 | 23.1 | 48 | 60 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 15 | 16 | 8 | 8 | 5 | 7.5 | 4 | 6.5 | 25.6 | 31.0 | 31.0 | 5 | 15 | 31.5 | 5 | 15 | 24.0 | 5 | 8 | 4 | 6.5 | 23.3 | 48 | 60 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|---------|------|---------|------|------------------|------|------|----|---------|-------|---------|------|---------|------|------|------|-----------|----------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9.5 | 30.9 | 27.0 | 27.0 | 4 | 20 | 56.0 | 4 | 20 | 22.0 | 4 | 11.5 | 4 | 9.5 | 44.1 | 64 | 76 | 4 | 7 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9.5 | 30.9 | 27.0 | 27.0 | 4 | 19 | 56.0 | 4 | 19 | 21.5 | 4 | 10.5 | 4 | 9 | 40.6 | 64 | 76 | 4 | 7 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 10.5 | 4 | 10.5 | 30.9 | 24.0 | 24.0 | 4 | 18 | 56.0 | 4 | 18 | 20.0 | 4 | 11.5 | 4 | 9 | 37.6 | 64 | 76 | 4 | 7 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 10.5 | 37.1 | 24.0 | 24.0 | 4 | 19 | 32.0 | 4 | 19 | 20.0 | 4 | 11 | 4 | 8.5 | 34.6 | 64 | 76 | 4 | 6.5 | 29.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 10 | 33.8 | 24.0 | 24.0 | 4 | 18 | 30.5 | 4 | 18 | 19.5 | 4 | 10 | 4 | 8 | 33.0 | 64 | 76 | 4 | 6 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 11 | 4 | 9 | 32.3 | 24.0 | 24.0 | 4 | 16 | 29.5 | 4 | 16 | 19.5 | 4 | 9 | 4 | 7.5 | 31.9 | 64 | 76 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 11.5 | 4 | 9.5 | 29.5 | 24.0 | 24.0 | 4 | 16 | 28.5 | 4 | 16 | 19.0 | 4 | 9 | 4 | 7.5 | 29.4 | 64 | 76 | 5 | 7.5 | 28.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 10 | 4 | 8 | 29.3 | 24.0 | 24.0 | 4 | 14 | 28.5 | 4 | 14 | 19.0 | 4 | 8 | 4 | 7 | 29.1 | 64 | 76 | 5 | 7 | 28.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 9 | 8 | 8 | 4 | 9 | 4 | 7 | 29.3 | 24.0 | 24.0 | 4 | 12 | 28.0 | 4 | 12 | 19.0 | 4 | 8 | 4 | 8 | 29.3 | 65 | 77 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 6.5 | 29.1 | 24.0 | 24.0 | 5 | 17 | 28.0 | 5 | 17 | 19.5 | 4 | 7 | 4 | 7.5 | 29.1 | 65 | 77 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 10 | 8 | 8 | 4 | 7 | 5 | 7 | 29.0 | 24.0 | 24.0 | 5 | 17 | 28.0 | 5 | 17 | 20.0 | 4 | 7.5 | 4 | 8.5 | 29.3 | 66 | 78 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 9 | 10 | 8 | 8 | 4 | 7 | 4 | 6.5 | 29.1 | 25.0 | 25.0 | 5 | 16 | 28.0 | 5 | 16 | 19.0 | 4 | 7 | 4 | 7.5 | 29.3 | 66 | 78 | 5 | 7 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 4 | 6 | 29.1 | 25.0 | 25.0 | 5 | 16 | 28.0 | 5 | 16 | 19.5 | 4 | 7 | 4 | 7.5 | 29.5 | 67 | 79 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 8 | 8 | 4 | 6.5 | 5 | 8 | 29.3 | 26.0 | 26.0 | 5 | 16 | 28.0 | 5 | 16 | 19.0 | 4 | 6.5 | 4 | 6.5 | 29.5 | 67 | 79 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 10 | 12 | 8 | 8 | 4 | 6.5 | 5 | 7.5 | 29.3 | 26.0 | 26.0 | 5 | 15 | 28.0 | 5 | 15 | 19.0 | 4 | 6.5 | 4 | 6.5 | 29.6 | 68 | 80 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 11 | 12 | 8 | 8 | 4 | 6.5 | 5 | 8.5 | 29.4 | 27.0 | 27.0 | 5 | 16 | 27.5 | 5 | 16 | 19.0 | 4 | 6.5 | 4 | 6 | 29.8 | 68 | 80 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 11 | 13 | 8 | 8 | 4 | 6 | 5 | 8 | 29.5 | 27.0 | 27.0 | 5 | 15 | 27.5 | 5 | 15 | 19.0 | 4 | 6.5 | 4 | 6 | 29.9 | 69 | 81 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 12 | 13 | 8 | 8 | 4 | 6 | 5 | 8.5 | 29.5 | 28.0 | 32.0 | 5 | 16 | 27.5 | 5 | 16 | 19.0 | 4 | 6 | 5 | 8.5 | 30.0 | 69 | 81 | 5 | 7 | 29.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | |
| 36 FT | 12 | 14 | 8 | 8 | 5 | 9 | 5 | 7.5 | 29.6 | 28.0 | 32.0 | 5 | 15 | 27.0 | 5 | 15 | 19.0 | 4 | 6.5 | 5 | 9 | 30.1 | 70 | 82 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | |
| 38 FT | 12 | 14 | 8 | 8 | 5 | 8.5 | 5 | 7.5 | 29.6 | 28.0 | 32.0 | 5 | 15 | 27.0 | 5 | 15 | 19.0 | 4 | 6 | 5 | 8.5 | 30.1 | 70 | 82 | 5 | 7 | 29.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |
| 40 FT | 13 | 14 | 8 | 8 | 5 | 8.5 | 5 | 7.5 | 29.6 | 29.0 | 33.0 | 5 | 16 | 27.0 | 5 | 16 | 19.0 | 5 | 8.5 | 5 | 8 | 30.3 | 70 | 82 | 5 | 7 | 29.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 42 FT | 13 | 15 | 8 | 8 | 5 | 8.5 | 5 | 7 | 29.8 | 29.0 | 33.0 | 5 | 15 | 26.5 | 5 | 15 | 19.0 | 4 | 6 | 5 | 8 | 30.4 | 71 | 83 | 5 | 7 | 28.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 44 FT | 13 | 15 | 8 | 8 | 5 | 8 | 5 | 6.5 | 29.8 | 29.0 | 33.0 | 5 | 14 | 26.5 | 5 | 14 | 19.0 | 5 | 9 | 5 | 8 | 30.4 | 71 | 83 | 5 | 7 | 28.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 46 FT | 14 | 16 | 9 | 8 | 5 | 8 | 5 | 8 | 30.5 | 30.0 | 34.0 | 5 | 16 | 26.0 | 5 | 16 | 19.0 | 5 | 9 | 5 | 9 | 31.0 | 72 | 84 | 5 | 7 | 29.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 48 FT | 14 | 16 | 9 | 8 | 5 | 8 | 5 | 8 | 30.4 | 30.0 | 34.0 | 5 | 15 | 26.0 | 5 | 15 | 19.0 | 5 | 8.5 | 5 | 8.5 | 31.0 | 72 | 84 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 50 FT | 14 | 16 | 10 | 8 | 5 | 7.5 | 5 | 7.5 | 31.0 | 30.0 | 30.0 | 5 | 15 | 26.0 | 5 | 15 | 19.0 | 5 | 8 | 4 | 6 | 31.1 | 72 | 84 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|---------|------|---------|------|------------------|------|------|----|---------|-------|---------|------|---------|------|------|------|-----------|----|-----|----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9.5 | 30.9 | 27.0 | 27.0 | 4 | 20 | 56.0 | 4 | 20 | 22.0 | 4 | 10.5 | 4 | 7 | 52.1 | 88 | 100 | 4 | 7 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9 | 30.9 | 27.0 | 27.0 | 4 | 20 | 56.0 | 4 | 20 | 22.0 | 4 | 10 | 4 | 6.5 | 50.0 | 88 | 100 | 4 | 6.5 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 10 | 4 | 7 | 30.9 | 24.0 | 24.0 | 4 | 18 | 56.0 | 4 | 18 | 20.5 | 4 | 10.5 | 4 | 6 | 47.4 | 88 | 100 | 4 | 6.5 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 8 | 8 | 4 | 12 | 4 | 7 | 51.6 | 24.0 | 24.0 | 4 | 19 | 32.5 | 4 | 19 | 20.0 | 4 | 12 | 4 | 6.5 | 46.3 | 89 | 101 | 4 | 7.5 | 29.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 8 | 8 | 4 | 12 | 4 | 6.5 | 44.5 | 24.0 | 24.0 | 4 | 18 | 30.5 | 4 | 18 | 19.5 | 4 | 11 | 4 | 6 | 44.0 | 89 | 101 | 4 | 7 | 29.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 9 | 9 | 8 | 4 | 11.5 | 4 | 7 | 40.8 | 24.0 | 24.0 | 4 | 16 | 29.5 | 4 | 16 | 19.5 | 4 | 10 | 4 | 6.5 | 41.4 | 89 | 101 | 4 | 6.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | |
| 12 FT | 8 | 9 | 9 | 8 | 4 | 12 | 4 | 7 | 36.9 | 24.0 | 24.0 | 4 | 17 | 28.0 | 4 | 17 | 19.0 | 4 | 10.5 | 4 | 7 | 38.3 | 89 | 101 | 4 | 6.5 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | |
| 14 FT | 8 | 9 | 9 | 8 | 4 | 10.5 | 4 | 6.5 | 36.4 | 24.0 | 24.0 | 4 | 15 | 28.0 | 4 | 15 | 19.0 | 4 | 9 | 4 | 6.5 | 37.9 | 89 | 101 | 4 | 6 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | |
| 16 FT | 8 | 9 | 9 | 8 | 4 | 9 | 5 | 7 | 36.0 | 24.0 | 28.0 | 4 | 13 | 28.0 | 4 | 13 | 19.0 | 4 | 8 | 5 | 7 | 37.5 | 89 | 101 | 5 | 7.5 | 28.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 9 | 8 | 4 | 8 | 5 | 6 | 35.8 | 24.0 | 28.0 | 5 | 18 | 28.0 | 5 | 18 | 19.0 | 4 | 7.5 | 5 | 6 | 37.3 | 89 | 101 | 5 | 7 | 28.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | |
| 20 FT | 8 | 10 | 9 | 8 | 4 | 7.5 | 6 | 7 | 38.4 | 24.0 | 28.0 | 5 | 17 | 28.0 | 5 | 17 | 19.5 | 4 | 7.5 | 5 | 6.5 | 38.1 | 90 | 102 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | |
| 22 FT | 9 | 10 | 9 | 8 | 4 | 7.5 | 5 | 6 | 36.4 | 25.0 | 29.0 | 5 | 17 | 27.5 | 5 | 17 | 19.0 | 4 | 7 | 5 | 6 | 37.8 | 90 | 102 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | |
| 24 FT | 9 | 11 | 9 | 8 | 4 | 7 | 5 | 6 | 36.1 | 25.0 | 29.0 | 5 | 16 | 27.5 | 5 | 16 | 19.0 | 4 | 7 | 5 | 6 | 38.5 | 91 | 103 | 5 | 8 | 29.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 9 | 8 | 4 | 7 | 5 | 6 | 36.9 | 26.0 | 30.0 | 5 | 17 | 27.5 | 5 | 17 | 19.0 | 4 | 6.5 | 5 | 6 | 38.3 | 91 | 103 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | |
| 28 FT | 10 | 12 | 9 | 8 | 4 | 6.5 | 5 | 6 | 36.8 | 30.0 | 30.0 | 5 | 16 | 27.5 | 5 | 16 | 19.0 | 4 | 7 | 5 | 6 | 38.9 | 92 | 104 | 5 | 8 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | |
| 30 FT | 11 | 12 | 9 | 8 | 4 | 6.5 | 5 | 6 | 37.4 | 31.0 | 31.0 | 5 | 17 | 27.0 | 5 | 17 | 19.0 | 4 | 6.5 | 6 | 7.5 | 41.6 | 92 | 104 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | |
| 32 FT | 11 | 13 | 9 | 8 | 4 | 6.5 | 6 | 7 | 40.3 | 31.0 | 31.0 | 5 | 16 | 27.0 | 5 | 16 | 19.0 | 4 | 6.5 | 5 | 6 | 39.1 | 93 | 105 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | |
| 34 FT | 11 | 13 | 9 | 8 | 4 | 6 | 6 | 7 | 40.1 | 31.0 | 35.0 | 5 | 15 | 27.0 | 5 | 15 | 19.0 | 4 | 6.5 | 6 | 7 | 42.1 | 93 | 105 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | |
| 36 FT | 12 | 14 | 10 | 8 | 4 | 6 | 5 | 6.5 | 37.8 | 32.0 | 32.0 | 5 | 17 | 26.0 | 5 | 17 | 19.0 | 4 | 6.5 | 5 | 7 | 39.5 | 94 | 106 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | |
| 38 FT | 12 | 14 | 10 | 8 | 5 | 9 | 5 | 6 | 37.6 | 32.0 | 32.0 | 5 | 16 | 26.0 | 5 | 16 | 19.0 | 4 | 6 | 5 | 6.5 | 39.5 | 94 | 106 | 5 | 7 | 29.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | |
| 40 FT | 12 | 15 | 11 | 8 | 5 | 8.5 | 5 | 7 | 37.8 | 28.0 | 32.0 | 5 | 15 | 26.0 | 5 | 15 | 19.0 | 4 | 6 | 5 | 7 | 40.0 | 95 | 107 | 5 | 7.5 | 29.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | |
| 42 FT | 13 | 15 | 11 | 8 | 5 | 8.5 | 5 | 7 | 38.3 | 33.0 | 33.0 | 5 | 17 | 25.5 | 5 | 17 | 18.5 | 4 | 6 | 5 | 7 | 39.9 | 95 | 107 | 5 | 7 | 29.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | |
| 44 FT | 13 | 15 | 11 | 8 | 5 | 8.5 | 5 | 6.5 | 38.1 | 33.0 | 33.0 | 5 | 16 | 25.5 | 5 | 16 | 18.5 | 5 | 9 | 5 | 7 | 39.9 | 95 | 107 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | |
| 46 FT | 13 | 16 | 12 | 8 | 5 | 8 | 5 | 6.5 | 38.3 | 29.0 | 33.0 | 5 | 16 | 25.5 | 5 | 16 | 18.5 | 4 | 6 | 5 | 7 | 40.4 | 96 | 108 | 5 | 7 | 29.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | |
| 48 FT | 14 | 16 | 12 | 8 | 5 | 8 | 5 | 6.5 | 38.8 | 34.0 | 34.0 | 5 | 17 | 25.0 | 5 | 17 | 18.5 | 5 | 9 | 5 | 6.5 | 40.4 | 96 | 108 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | |
| 50 FT | 14 | 16 | 12 | 8 | 5 | 7.5 | 5 | 6.5 | 38.8 | 34.0 | 34.0 | 5 | 17 | 25.0 | 5 | 17 | 18.5 | 5 | 8.5 | 5 | 6.5 | 40.3 | 96 | 108 | 5 | 6.5 | 29.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.


DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



**CONCRETE
DOUBLE BOX CULVERT**

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 5 FEET
HEIGHT (HT): 7 THRU 8 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
5 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------|---------|------|------------------|---------|------|---------|------|------|------|-------|---------|-------|------------------------------------|---------|-----------|---------|------|------|------|----|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | | HT=3' | HT=4' | HT=5' | | | | | | | | | | | | HT=3' | HT=4' | HT=5' | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 5 | 8.5 | 4 | 9.5 | 34.5 | 27.0 | 27.0 | 27.0 | 4 | 16 | 64.5 | 4 | 16 | 23.0 | 4 | 9.5 | 4 | 9.5 | 37.6 | 40 | 52 | 64 | 4 | 6 | 34.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 5 | 8.5 | 4 | 9.5 | 34.5 | 27.0 | 27.0 | 27.0 | 4 | 15 | 64.5 | 4 | 15 | 22.5 | 4 | 9 | 4 | 9 | 35.0 | 40 | 52 | 64 | 5 | 7.5 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 8 | 4 | 9 | 34.0 | 24.0 | 24.0 | 24.0 | 4 | 13 | 43.5 | 4 | 13 | 21.0 | 4 | 9 | 4 | 9.5 | 32.0 | 40 | 52 | 64 | 5 | 7.5 | 33.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 9.5 | 4 | 9.5 | 30.4 | 24.0 | 24.0 | 24.0 | 4 | 13 | 35.5 | 4 | 13 | 20.5 | 4 | 8.5 | 4 | 9 | 29.9 | 40 | 52 | 64 | 5 | 7 | 32.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 9 | 4 | 9 | 29.3 | 24.0 | 24.0 | 24.0 | 4 | 12 | 34.0 | 4 | 12 | 20.5 | 4 | 7.5 | 4 | 8 | 28.9 | 40 | 52 | 64 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 10 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 8 | 28.8 | 24.0 | 24.0 | 24.0 | 5 | 17 | 33.0 | 5 | 17 | 20.5 | 4 | 7.5 | 4 | 10 | 27.8 | 41 | 53 | 65 | 5 | 7 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 12 FT | 8 | 9 | 8 | 8 | 4 | 7 | 4 | 7 | 28.4 | 24.0 | 24.0 | 24.0 | 5 | 16 | 32.5 | 5 | 16 | 21.5 | 4 | 6.5 | 4 | 9 | 27.3 | 41 | 53 | 65 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 14 FT | 8 | 9 | 8 | 8 | 4 | 7.5 | 4 | 7 | 27.0 | 24.0 | 24.0 | 24.0 | 5 | 16 | 31.5 | 5 | 16 | 21.5 | 4 | 6.6 | 4 | 9.5 | 25.9 | 41 | 53 | 65 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 16 FT | 8 | 10 | 8 | 8 | 4 | 6.5 | 4 | 6 | 27.1 | 24.0 | 24.0 | 24.0 | 5 | 15 | 31.5 | 5 | 15 | 22.5 | 4 | 6.5 | 4 | 11.5 | 25.3 | 42 | 54 | 66 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 18 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 4 | 7.5 | 26.6 | 25.0 | 25.0 | 25.0 | 5 | 16 | 31.5 | 5 | 16 | 21.5 | 4 | 6.5 | 4 | 10.5 | 25.0 | 43 | 55 | 67 | 5 | 7 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 20 FT | 10 | 11 | 8 | 8 | 4 | 6 | 4 | 7.5 | 26.1 | 26.0 | 26.0 | 26.0 | 5 | 15 | 31.5 | 5 | 15 | 21.0 | 4 | 6 | 4 | 10 | 25.3 | 43 | 55 | 67 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 22 FT | 10 | 12 | 8 | 8 | 5 | 9 | 4 | 6.5 | 26.3 | 26.0 | 26.0 | 26.0 | 5 | 15 | 31.5 | 5 | 15 | 21.5 | 4 | 6 | 4 | 9.5 | 24.9 | 44 | 56 | 68 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 24 FT | 11 | 12 | 8 | 8 | 5 | 9 | 4 | 7 | 25.9 | 27.0 | 27.0 | 27.0 | 5 | 14 | 31.5 | 5 | 14 | 21.0 | 5 | 8.5 | 4 | 9 | 25.1 | 44 | 56 | 68 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 26 FT | 11 | 13 | 8 | 8 | 5 | 8.5 | 4 | 6 | 26.0 | 27.0 | 27.0 | 27.0 | 5 | 14 | 31.5 | 5 | 14 | 21.5 | 5 | 8.5 | 4 | 8.5 | 24.9 | 45 | 57 | 69 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 28 FT | 12 | 14 | 8 | 8 | 5 | 8.5 | 4 | 6.5 | 25.9 | 28.0 | 28.0 | 28.0 | 5 | 13 | 31.5 | 5 | 13 | 20.5 | 5 | 9 | 4 | 7.5 | 25.0 | 46 | 58 | 70 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 30 FT | 13 | 14 | 8 | 8 | 5 | 8.5 | 4 | 6.5 | 25.6 | 29.0 | 29.0 | 29.0 | 5 | 12 | 31.0 | 5 | 12 | 20.0 | 5 | 8.5 | 4 | 7.5 | 25.1 | 46 | 58 | 70 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 32 FT | 13 | 15 | 8 | 8 | 5 | 8 | 4 | 6 | 25.8 | 29.0 | 29.0 | 29.0 | 5 | 12 | 31.0 | 5 | 12 | 20.5 | 5 | 8.5 | 4 | 7 | 25.1 | 47 | 59 | 71 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 34 FT | 14 | 15 | 8 | 8 | 5 | 8 | 4 | 6 | 25.5 | 30.0 | 30.0 | 30.0 | 5 | 12 | 31.0 | 5 | 12 | 20.0 | 5 | 8 | 4 | 7 | 25.3 | 47 | 59 | 71 | 6 | 8.5 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 36 FT | 14 | 16 | 8 | 8 | 5 | 7.5 | 5 | 8.5 | 25.8 | 30.0 | 30.0 | 30.0 | 5 | 12 | 31.0 | 5 | 12 | 20.0 | 5 | 8 | 4 | 6.5 | 25.3 | 48 | 60 | 72 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 38 FT | 15 | 16 | 8 | 8 | 5 | 7.5 | 4 | 6 | 27.5 | 31.0 | 31.0 | 31.0 | 5 | 12 | 35.5 | 5 | 12 | 25.0 | 5 | 7.5 | 4 | 6.5 | 25.4 | 48 | 60 | 72 | 6 | 8 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 40 FT | 15 | 17 | 8 | 8 | 5 | 7 | 5 | 8 | 30.8 | 31.0 | 31.0 | 31.0 | 6 | 17 | 39.5 | 6 | 17 | 29.0 | 5 | 7.5 | 4 | 6 | 25.4 | 49 | 61 | 73 | 6 | 8.5 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 42 FT | 16 | 17 | 8 | 8 | 5 | 7 | 5 | 7 | 30.6 | 32.0 | 32.0 | 32.0 | 5 | 12 | 35.0 | 5 | 12 | 25.0 | 5 | 7.5 | 4 | 6 | 25.6 | 49 | 61 | 73 | 6 | 8 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 44 FT | 16 | 18 | 8 | 8 | 5 | 6.5 | 5 | 7 | 30.8 | 32.0 | 32.0 | 36.0 | 6 | 17 | 39.0 | 6 | 17 | 29.0 | 5 | 7.5 | 5 | 6.5 | 25.6 | 50 | 62 | 74 | 6 | 8 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 46 FT | 16 | 18 | 8 | 8 | 5 | 6 | 5 | 7 | 30.8 | 32.0 | 32.0 | 36.0 | 6 | 16 | 39.0 | 6 | 16 | 29.0 | 5 | 7 | 5 | 6.5 | 25.6 | 50 | 62 | 74 | 6 | 8 | 35.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | |
| 48 FT | 17 | 19 | 8 | 8 | 5 | 6.5 | 5 | 6.5 | 30.8 | 37.0 | 37.0 | 37.0 | 5 | 12 | 34.5 | 5 | 12 | 24.5 | 5 | 7.5 | 5 | 6.5 | 25.9 | 51 | 63 | 75 | 6 | 8 | 35.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | |
| 50 FT | 17 | 19 | 8 | 8 | 5 | 6 | 5 | 6.5 | 30.8 | 37.0 | 37.0 | 37.0 | 6 | 16 | 38.5 | 6 | 16 | 28.5 | 5 | 7 | 5 | 6.5 | 25.9 | 51 | 63 | 75 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | |

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|---------|------|---------|------|------------------|------|------|------|---------|------|---------|-------|---------|------|----------------------------|------|-----------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=6' | HT=7' | | | | | | | | | | | | HT=6' | HT=7' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 5 | 8 | 4 | 9.5 | 34.5 | 27.0 | 27.0 | 4 | 16 | 64.5 | 4 | 16 | 23.5 | 4 | 9 | 4 | 7.5 | 48.9 | 76 | 88 | 5 | 7.5 | 34.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 5 | 8 | 4 | 9.5 | 34.5 | 27.0 | 27.0 | 4 | 15 | 64.5 | 4 | 15 | 23.0 | 4 | 8.5 | 4 | 7 | 45.0 | 76 | 88 | 5 | 7.5 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 7.5 | 4 | 7.5 | 34.5 | 24.0 | 24.0 | 4 | 13 | 64.5 | 4 | 13 | 21.0 | 4 | 8.5 | 4 | 7 | 41.6 | 76 | 88 | 5 | 7 | 33.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 9 | 4 | 7.5 | 40.9 | 24.0 | 24.0 | 4 | 13 | 36.0 | 4 | 13 | 20.5 | 4 | 8 | 4 | 6.5 | 38.1 | 76 | 88 | 5 | 7 | 32.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 9 | 4 | 7 | 37.0 | 24.0 | 24.0 | 4 | 12 | 34.0 | 4 | 12 | 20.5 | 4 | 7.5 | 4 | 6 | 36.3 | 76 | 88 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 6 | 35.1 | 24.0 | 24.0 | 5 | 17 | 33.0 | 5 | 17 | 21.0 | 4 | 7.5 | 4 | 6.5 | 35.5 | 77 | 89 | 5 | 7 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 8 | 9 | 8 | 8 | 4 | 7 | 5 | 6.5 | 34.1 | 24.0 | 24.0 | 5 | 16 | 32.5 | 5 | 16 | 21.5 | 4 | 6.5 | 4 | 6 | 34.5 | 77 | 89 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 8 | 9 | 8 | 8 | 4 | 7 | 5 | 6.5 | 31.8 | 24.0 | 24.0 | 5 | 16 | 31.5 | 5 | 16 | 21.5 | 4 | 6.5 | 4 | 6 | 32.0 | 77 | 89 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 8 | 10 | 8 | 8 | 4 | 6.5 | 5 | 6 | 31.6 | 24.0 | 24.0 | 5 | 15 | 31.0 | 5 | 15 | 22.5 | 4 | 6.5 | 4 | 7 | 32.0 | 78 | 90 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 5 | 6.5 | 31.8 | 25.0 | 25.0 | 5 | 16 | 31.0 | 5 | 16 | 21.5 | 4 | 6.5 | 4 | 6.5 | 32.3 | 79 | 91 | 5 | 7 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 10 | 11 | 8 | 8 | 4 | 6 | 5 | 7.5 | 31.8 | 26.0 | 30.0 | 5 | 15 | 31.0 | 5 | 15 | 21.0 | 4 | 6 | 5 | 7.5 | 32.1 | 79 | 91 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 10 | 12 | 8 | 8 | 5 | 9 | 5 | 7 | 31.6 | 26.0 | 30.0 | 5 | 15 | 31.0 | 5 | 15 | 21.5 | 4 | 6 | 5 | 8 | 32.3 | 80 | 92 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 11 | 12 | 8 | 8 | 5 | 9 | 5 | 7.5 | 31.8 | 27.0 | 31.0 | 5 | 14 | 31.0 | 5 | 14 | 20.5 | 5 | 8.5 | 5 | 7.5 | 32.1 | 80 | 92 | 5 | 6 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 11 | 13 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 31.8 | 27.0 | 31.0 | 5 | 14 | 31.0 | 5 | 14 | 21.0 | 5 | 9 | 5 | 7.5 | 32.3 | 81 | 93 | 5 | 6 | 32.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 12 | 14 | 8 | 8 | 5 | 8.5 | 5 | 7 | 31.9 | 28.0 | 32.0 | 5 | 13 | 30.5 | 5 | 13 | 20.0 | 5 | 9 | 5 | 8 | 32.6 | 82 | 94 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 12 | 14 | 8 | 8 | 5 | 7.5 | 5 | 6.5 | 31.8 | 28.0 | 32.0 | 5 | 13 | 30.5 | 5 | 13 | 20.5 | 5 | 8.5 | 5 | 7.5 | 32.5 | 82 | 94 | 5 | 6 | 32.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 13 | 15 | 8 | 8 | 5 | 8 | 5 | 6.5 | 32.0 | 29.0 | 33.0 | 5 | 12 | 30.0 | 5 | 12 | 20.0 | 5 | 8.5 | 5 | 7.5 | 32.8 | 83 | 95 | 5 | 6 | 32.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 13 | 15 | 8 | 8 | 5 | 7 | 5 | 6 | 31.9 | 29.0 | 33.0 | 5 | 12 | 30.0 | 5 | 12 | 20.0 | 5 | 8 | 5 | 7 | 32.8 | 83 | 95 | 5 | 6 | 32.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 14 | 16 | 9 | 8 | 5 | 7.5 | 5 | 7.5 | 32.6 | 30.0 | 34.0 | 5 | 12 | 29.5 | 5 | 12 | 19.5 | 5 | 8 | 5 | 8 | 33.3 | 84 | 96 | 5 | 6 | 32.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 14 | 16 | 9 | 8 | 5 | 7 | 5 | 7 | 32.5 | 30.0 | 34.0 | 5 | 12 | 29.5 | 5 | 12 | 19.5 | 5 | 8 | 5 | 8 | 33.1 | 84 | 96 | 6 | 8 | 35.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 15 | 17 | 9 | 8 | 5 | 7 | 5 | 6.5 | 37.8 | 31.0 | 35.0 | 5 | 13 | 34.0 | 5 | 13 | 24.5 | 5 | 8 | 5 | 8 | 33.5 | 85 | 97 | 6 | 8.5 | 35.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 15 | 17 | 10 | 8 | 5 | 7 | 5 | 7.5 | 38.3 | 31.0 | 35.0 | 5 | 12 | 34.0 | 5 | 12 | 24.5 | 5 | 7.5 | 5 | 7.5 | 33.6 | 85 | 97 | 6 | 8 | 35.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 15 | 18 | 10 | 8 | 5 | 6 | 5 | 7 | 38.4 | 31.0 | 35.0 | 5 | 12 | 34.0 | 5 | 12 | 24.5 | 5 | 7.5 | 5 | 7.5 | 33.9 | 86 | 98 | 6 | 8 | 35.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 16 | 18 | 10 | 8 | 5 | 6.5 | 5 | 6.5 | 38.4 | 32.0 | 36.0 | 5 | 12 | 33.0 | 5 | 12 | 24.5 | 5 | 7.5 | 5 | 7.5 | 34.0 | 86 | 98 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 16 | 19 | 11 | 8 | 5 | 6.5 | 5 | 7 | 39.0 | 32.0 | 36.0 | 5 | 12 | 33.0 | 5 | 12 | 24.5 | 5 | 7.5 | 5 | 8.5 | 34.4 | 87 | 99 | 6 | 8 | 35.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 17 | 19 | 11 | 8 | 5 | 6.5 | 5 | 7 | 39.1 | 33.0 | 37.0 | 5 | 13 | 32.5 | 5 | 13 | 24.5 | 5 | 7 | 5 | 8 | 34.5 | 87 | 99 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|---------|------|---------|------|------------------|------|------|----|---------|-------|---------|------|---------|------|------|------|-----------|----------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | | | | | | | | | | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 9 | 8 | 8 | 5 | 8 | 4 | 7 | 34.5 | 27.0 | 27.0 | 4 | 16 | 64.5 | 4 | 16 | 23.5 | 4 | 9.5 | 4 | 6.5 | 59.4 | 101 | 113 | 4 | 6.5 | 34.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 11 | 9 | 8 | 8 | 5 | 8 | 4 | 6.5 | 34.5 | 27.0 | 27.0 | 4 | 16 | 64.5 | 4 | 16 | 23.0 | 4 | 9 | 4 | 6 | 57.0 | 101 | 113 | 4 | 6 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 8 | 9 | 9 | 8 | 4 | 7.5 | 4 | 6.5 | 35.1 | 24.0 | 24.0 | 4 | 13 | 65.0 | 4 | 13 | 21.0 | 4 | 9.5 | 4 | 6.5 | 53.0 | 101 | 113 | 4 | 6 | 33.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 9 | 8 | 4 | 9 | 4 | 6 | 53.1 | 24.0 | 24.0 | 4 | 13 | 36.0 | 4 | 13 | 20.5 | 4 | 9 | 4 | 6 | 49.5 | 101 | 113 | 4 | 6 | 33.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 9 | 8 | 4 | 9 | 5 | 7 | 46.5 | 24.0 | 28.0 | 4 | 12 | 33.5 | 4 | 12 | 20.5 | 4 | 8 | 5 | 6.5 | 46.5 | 101 | 113 | 5 | 7.5 | 32.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 8 | 9 | 9 | 8 | 4 | 8 | 5 | 6 | 43.8 | 24.0 | 28.0 | 5 | 17 | 32.5 | 5 | 17 | 20.5 | 4 | 7.5 | 5 | 6 | 44.6 | 101 | 113 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 8 | 9 | 10 | 8 | 4 | 7.5 | 5 | 6.5 | 41.8 | 24.0 | 28.0 | 5 | 17 | 32.0 | 5 | 17 | 21.5 | 4 | 6.5 | 5 | 6.5 | 42.9 | 101 | 113 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 8 | 9 | 10 | 8 | 4 | 7.5 | 5 | 6.5 | 38.5 | 24.0 | 28.0 | 5 | 17 | 31.0 | 5 | 17 | 21.0 | 4 | 6.5 | 5 | 6.5 | 39.6 | 101 | 113 | 5 | 6 | 31.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 8 | 10 | 10 | 8 | 4 | 6.5 | 5 | 6 | 38.1 | 24.0 | 28.0 | 5 | 16 | 31.0 | 5 | 16 | 22.0 | 4 | 6.5 | 5 | 7 | 40.6 | 102 | 114 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 9 | 11 | 10 | 8 | 4 | 6.5 | 5 | 6 | 38.8 | 25.0 | 29.0 | 5 | 16 | 31.0 | 5 | 16 | 21.0 | 4 | 6.5 | 5 | 7 | 41.1 | 103 | 115 | 5 | 7 | 32.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 9 | 11 | 10 | 8 | 4 | 6 | 5 | 6 | 38.5 | 25.0 | 29.0 | 5 | 16 | 31.0 | 5 | 16 | 22.0 | 4 | 6 | 5 | 6.5 | 40.9 | 103 | 115 | 5 | 6 | 32.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 10 | 12 | 10 | 8 | 4 | 6 | 5 | 6.5 | 39.1 | 30.0 | 30.0 | 5 | 15 | 30.5 | 5 | 15 | 21.0 | 4 | 6 | 5 | 6.5 | 41.4 | 104 | 116 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 11 | 13 | 10 | 8 | 4 | 6 | 5 | 6.5 | 39.6 | 31.0 | 31.0 | 5 | 14 | 30.5 | 5 | 14 | 20.0 | 4 | 6 | 5 | 6.5 | 41.8 | 105 | 117 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 11 | 13 | 10 | 8 | 5 | 9 | 5 | 6 | 39.4 | 31.0 | 31.0 | 5 | 14 | 30.5 | 5 | 14 | 20.5 | 5 | 9 | 5 | 6.5 | 41.6 | 105 | 117 | 5 | 6 | 32.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 12 | 14 | 10 | 8 | 5 | 9 | 5 | 6 | 40.0 | 32.0 | 32.0 | 5 | 13 | 30.0 | 5 | 13 | 19.5 | 4 | 6 | 5 | 6.5 | 42.0 | 106 | 118 | 5 | 6.5 | 32.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 12 | 14 | 10 | 8 | 5 | 8 | 5 | 6 | 39.9 | 32.0 | 32.0 | 5 | 13 | 30.0 | 5 | 13 | 20.0 | 5 | 8.5 | 5 | 6 | 41.9 | 106 | 118 | 5 | 6 | 32.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 13 | 15 | 11 | 8 | 5 | 8.5 | 5 | 7 | 40.4 | 33.0 | 33.0 | 5 | 13 | 29.0 | 5 | 13 | 19.5 | 5 | 8.5 | 5 | 7 | 42.3 | 107 | 119 | 5 | 6 | 32.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 13 | 15 | 11 | 8 | 5 | 8 | 5 | 6.5 | 40.3 | 33.0 | 33.0 | 5 | 13 | 29.0 | 5 | 13 | 19.5 | 5 | 8 | 5 | 7 | 42.1 | 107 | 119 | 6 | 8 | 35.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 14 | 16 | 11 | 8 | 5 | 8 | 5 | 6 | 40.8 | 34.0 | 34.0 | 5 | 14 | 28.5 | 5 | 14 | 19.5 | 5 | 8.5 | 5 | 7 | 42.6 | 108 | 120 | 5 | 6 | 32.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 14 | 16 | 12 | 8 | 5 | 7.5 | 5 | 6.5 | 40.8 | 34.0 | 34.0 | 5 | 13 | 28.5 | 5 | 13 | 19.5 | 5 | 7.5 | 5 | 6.5 | 42.5 | 108 | 120 | 6 | 8 | 35.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 14 | 17 | 12 | 8 | 5 | 7 | 5 | 6 | 40.8 | 34.0 | 34.0 | 5 | 12 | 28.5 | 5 | 12 | 19.5 | 5 | 8 | 5 | 6.5 | 43.0 | 109 | 121 | 6 | 8 | 35.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 15 | 17 | 13 | 8 | 5 | 7 | 5 | 6 | 46.4 | 35.0 | 35.0 | 5 | 13 | 33.0 | 5 | 13 | 24.5 | 5 | 7 | 5 | 6 | 42.8 | 109 | 121 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 15 | 18 | 13 | 8 | 5 | 7 | 5 | 6 | 46.4 | 35.0 | 35.0 | 5 | 13 | 33.0 | 5 | 13 | 24.5 | 5 | 7.5 | 5 | 6 | 43.3 | 110 | 122 | 6 | 8 | 35.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 15 | 18 | 13 | 8 | 5 | 6 | 5 | 6 | 46.3 | 35.0 | 35.0 | 5 | 12 | 33.0 | 5 | 12 | 24.5 | 5 | 7.5 | 5 | 6 | 43.3 | 110 | 122 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 16 | 19 | 14 | 8 | 5 | 6.5 | 5 | 6 | 47.0 | 36.0 | 36.0 | 5 | 14 | 32.5 | 5 | 14 | 24.0 | 5 | 7.5 | 5 | 6 | 43.8 | 111 | 123 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 16 | 19 | 14 | 8 | 5 | 6 | 5 | 6 | 46.9 | 36.0 | 36.0 | 5 | 13 | 32.5 | 5 | 13 | 24.0 | 5 | 7 | 5 | 6 | 43.6 | 111 | 123 | 6 | 7.5 | 35.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |



| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|------|------|---------|------|------|------|------------------|------|---------|-------|-------|-------|------|------|---------|------|------|---------|------------------------------------|---------|----|--|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | HT=4' | HT=5' | HT=6' | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | HT=4' | HT=5' | HT=6' | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 FT | 12 | 8 | 8 | 8 | 5 | 8 | 4 | 8.5 | 38.1 | 28.0 | 28.0 | 28.0 | 4 | 15 | 73.0 | 4 | 15 | 25.5 | 4 | 7 | 4 | 6.5 | 41.8 | 52 | 64 | 76 | 5 | 6.5 | 37.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 12 | 9 | 8 | 8 | 5 | 7.5 | 4 | 8.5 | 38.1 | 28.0 | 28.0 | 28.0 | 4 | 14 | 73.0 | 4 | 14 | 24.5 | 4 | 7.5 | 4 | 8.5 | 39.9 | 53 | 65 | 77 | 5 | 7 | 37.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 6 | 4 | 6.5 | 38.4 | 24.0 | 24.0 | 24.0 | 5 | 17 | 48.0 | 5 | 17 | 23.5 | 4 | 7 | 4 | 7 | 35.8 | 52 | 64 | 76 | 5 | 6 | 36.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 7 | 4 | 7 | 33.9 | 24.0 | 24.0 | 24.0 | 5 | 17 | 39.0 | 5 | 17 | 23.5 | 4 | 6.5 | 4 | 6.5 | 33.3 | 52 | 64 | 76 | 6 | 7 | 38.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 8 | 8 | 4 | 7 | 4 | 6.5 | 32.1 | 24.0 | 24.0 | 24.0 | 5 | 16 | 37.0 | 5 | 16 | 24.0 | 4 | 6.5 | 4 | 8 | 31.8 | 53 | 65 | 77 | 5 | 6 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 10 | 8 | 8 | 4 | 6 | 5 | 7 | 31.5 | 24.0 | 24.0 | 24.0 | 5 | 15 | 36.0 | 5 | 15 | 24.0 | 4 | 6.5 | 4 | 9.5 | 30.5 | 54 | 66 | 78 | 5 | 6.5 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 9 | 10 | 8 | 8 | 4 | 6 | 4 | 6.5 | 30.5 | 25.0 | 25.0 | 25.0 | 5 | 15 | 35.5 | 5 | 15 | 24.0 | 5 | 9 | 4 | 8.5 | 29.8 | 54 | 66 | 78 | 5 | 6 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 9 | 11 | 8 | 8 | 5 | 8.5 | 5 | 7 | 30.4 | 25.0 | 25.0 | 25.0 | 5 | 14 | 35.5 | 5 | 14 | 24.0 | 5 | 9 | 4 | 8.5 | 29.1 | 55 | 67 | 79 | 5 | 6 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 10 | 11 | 8 | 8 | 4 | 6 | 4 | 6.5 | 28.5 | 26.0 | 26.0 | 26.0 | 5 | 15 | 34.5 | 5 | 15 | 23.0 | 5 | 8.5 | 4 | 8 | 27.8 | 55 | 67 | 79 | 5 | 6 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 10 | 12 | 8 | 8 | 5 | 8 | 5 | 8 | 28.6 | 26.0 | 26.0 | 26.0 | 5 | 14 | 34.5 | 5 | 14 | 23.5 | 5 | 8.5 | 4 | 8.5 | 27.4 | 56 | 68 | 80 | 5 | 6 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 11 | 12 | 8 | 8 | 5 | 8 | 5 | 9 | 28.1 | 27.0 | 27.0 | 27.0 | 5 | 14 | 34.5 | 5 | 14 | 23.5 | 5 | 7 | 4 | 7 | 27.5 | 56 | 68 | 80 | 6 | 7 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 12 | 13 | 8 | 8 | 5 | 8 | 5 | 8.5 | 27.9 | 28.0 | 28.0 | 28.0 | 5 | 13 | 34.5 | 5 | 13 | 23.0 | 5 | 7.5 | 4 | 7 | 27.5 | 57 | 69 | 81 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 12 | 14 | 8 | 8 | 5 | 7.5 | 5 | 8.5 | 28.0 | 28.0 | 28.0 | 28.0 | 5 | 13 | 34.5 | 5 | 13 | 23.5 | 5 | 7.5 | 4 | 7 | 27.3 | 58 | 70 | 82 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 13 | 15 | 8 | 8 | 5 | 7 | 5 | 8.5 | 27.9 | 29.0 | 29.0 | 29.0 | 5 | 12 | 34.5 | 5 | 12 | 22.5 | 5 | 7.5 | 4 | 7 | 27.4 | 59 | 71 | 83 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 14 | 15 | 8 | 8 | 5 | 7 | 5 | 8.5 | 27.6 | 30.0 | 30.0 | 30.0 | 5 | 12 | 34.0 | 5 | 12 | 22.0 | 5 | 7 | 4 | 6.5 | 27.6 | 59 | 71 | 83 | 6 | 7 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 14 | 16 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 27.8 | 30.0 | 30.0 | 30.0 | 5 | 12 | 34.0 | 5 | 12 | 22.5 | 5 | 7 | 4 | 6.5 | 27.5 | 60 | 72 | 84 | 6 | 7 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 15 | 17 | 8 | 8 | 5 | 6.5 | 5 | 8 | 32.8 | 31.0 | 31.0 | 31.0 | 6 | 16 | 43.0 | 6 | 16 | 30.5 | 5 | 7.5 | 4 | 6 | 27.8 | 61 | 73 | 85 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 16 | 17 | 8 | 8 | 5 | 6.5 | 5 | 7 | 32.6 | 32.0 | 32.0 | 32.0 | 6 | 15 | 42.5 | 6 | 15 | 29.5 | 5 | 7 | 4 | 6 | 27.9 | 61 | 73 | 85 | 6 | 7 | 38.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 16 | 18 | 8 | 8 | 5 | 6 | 5 | 7 | 32.8 | 32.0 | 36.0 | 36.0 | 6 | 15 | 42.5 | 6 | 15 | 30.0 | 5 | 7 | 5 | 6.5 | 27.9 | 62 | 74 | 86 | 6 | 7 | 38.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 17 | 18 | 8 | 8 | 5 | 6 | 5 | 6.5 | 32.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 42.0 | 6 | 14 | 29.5 | 5 | 6 | 5 | 6.5 | 28.0 | 62 | 74 | 86 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 17 | 19 | 8 | 8 | 5 | 6 | 5 | 6.5 | 32.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 42.0 | 6 | 14 | 30.0 | 5 | 6.5 | 5 | 6.5 | 28.0 | 63 | 75 | 87 | 6 | 7 | 38.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 18 | 20 | 8 | 8 | 5 | 6 | 5 | 6.5 | 32.9 | 38.0 | 38.0 | 38.0 | 6 | 14 | 41.5 | 6 | 14 | 29.5 | 5 | 6.5 | 5 | 6 | 28.3 | 64 | 76 | 88 | 6 | 7 | 38.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 18 | 20 | 8 | 8 | 6 | 8 | 5 | 6.5 | 32.9 | 38.0 | 38.0 | 38.0 | 6 | 14 | 41.5 | 6 | 14 | 29.5 | 5 | 6.5 | 5 | 6 | 28.3 | 64 | 76 | 88 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 19 | 21 | 8 | 8 | 6 | 8 | 5 | 6 | 33.0 | 39.0 | 39.0 | 39.0 | 6 | 14 | 41.0 | 6 | 14 | 29.5 | 5 | 6.5 | 6 | 7.5 | 31.5 | 65 | 77 | 89 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 19 | 21 | 8 | 8 | 6 | 8 | 5 | 6 | 32.9 | 39.0 | 39.0 | 39.0 | 6 | 14 | 41.0 | 6 | 14 | 29.5 | 5 | 6 | 6 | 7.5 | 31.4 | 65 | 77 | 89 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 20 | 22 | 9 | 8 | 6 | 8 | 5 | 6.5 | 33.8 | 40.0 | 40.0 | 40.0 | 6 | 15 | 40.0 | 6 | 15 | 29.0 | 5 | 6 | 5 | 6 | 29.0 | 66 | 78 | 90 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|----|------------------|-------|------|------|---------|------|------|----------------------------|---------|----|---------|----|--|--|--|--|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 8 | 5 | 7.5 | 4 | 8.5 | 38.1 | 28.0 | 28.0 | 4 | 15 | 73.0 | 4 | 15 | 25.5 | 4 | 7.5 | 4 | 7 | 56.0 | 89 | 101 | 5 | 7 | 37.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 12 | 9 | 8 | 8 | 5 | 7.5 | 4 | 8 | 38.1 | 28.0 | 28.0 | 4 | 15 | 73.0 | 4 | 15 | 25.0 | 4 | 7 | 4 | 6.5 | 51.4 | 89 | 101 | 5 | 7 | 37.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 6.5 | 40.1 | 24.0 | 24.0 | 5 | 17 | 75.0 | 5 | 17 | 23.5 | 4 | 7.5 | 4 | 6.5 | 47.8 | 89 | 101 | 5 | 7 | 37.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 8 | 8 | 4 | 7 | 5 | 6.5 | 44.6 | 24.0 | 24.0 | 5 | 17 | 39.5 | 5 | 17 | 23.5 | 4 | 7 | 4 | 6 | 43.5 | 89 | 101 | 5 | 6.5 | 36.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 9 | 8 | 4 | 7 | 4 | 6 | 40.1 | 24.0 | 24.0 | 5 | 16 | 37.0 | 5 | 16 | 23.5 | 4 | 6.5 | 4 | 6.5 | 40.4 | 89 | 101 | 5 | 6 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 8 | 10 | 9 | 8 | 4 | 6.5 | 5 | 6 | 38.4 | 24.0 | 24.0 | 5 | 15 | 36.0 | 5 | 15 | 24.0 | 4 | 6.5 | 4 | 7 | 39.5 | 90 | 102 | 5 | 6.5 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 9 | 10 | 9 | 8 | 4 | 6 | 5 | 6.5 | 37.8 | 25.0 | 25.0 | 5 | 15 | 35.5 | 5 | 15 | 24.0 | 5 | 9 | 4 | 6 | 38.1 | 90 | 102 | 5 | 6 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 9 | 11 | 9 | 8 | 5 | 8.5 | 5 | 6 | 37.1 | 25.0 | 25.0 | 5 | 14 | 35.0 | 5 | 14 | 23.5 | 5 | 9 | 4 | 6 | 37.9 | 91 | 103 | 5 | 6 | 35.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 9 | 11 | 9 | 8 | 5 | 8.5 | 5 | 6 | 34.8 | 25.0 | 25.0 | 5 | 14 | 34.0 | 5 | 14 | 23.5 | 5 | 8.5 | 4 | 6 | 35.3 | 91 | 103 | 5 | 6 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 10 | 12 | 9 | 8 | 5 | 8.5 | 5 | 7 | 34.9 | 26.0 | 30.0 | 5 | 14 | 34.0 | 5 | 14 | 23.5 | 5 | 8.5 | 5 | 8.5 | 35.3 | 92 | 104 | 5 | 6 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 11 | 13 | 9 | 8 | 5 | 8 | 5 | 7.5 | 34.9 | 27.0 | 31.0 | 5 | 14 | 34.0 | 5 | 14 | 23.0 | 5 | 8.5 | 5 | 8 | 35.4 | 93 | 105 | 6 | 8 | 38.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 11 | 13 | 9 | 8 | 5 | 7 | 5 | 6.5 | 34.8 | 27.0 | 31.0 | 5 | 13 | 34.0 | 5 | 13 | 23.5 | 5 | 7.5 | 5 | 8 | 35.1 | 93 | 105 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 12 | 14 | 9 | 8 | 5 | 7.5 | 5 | 7 | 34.8 | 28.0 | 32.0 | 5 | 13 | 34.0 | 5 | 13 | 23.0 | 5 | 8 | 5 | 8 | 35.4 | 94 | 106 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 13 | 15 | 9 | 8 | 5 | 7.5 | 5 | 7 | 34.9 | 29.0 | 33.0 | 5 | 12 | 33.5 | 5 | 12 | 22.0 | 5 | 8 | 5 | 8 | 35.6 | 95 | 107 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 13 | 15 | 9 | 8 | 5 | 6.5 | 5 | 6.5 | 34.8 | 33.0 | 33.0 | 5 | 12 | 33.5 | 5 | 12 | 22.5 | 5 | 7 | 5 | 7.5 | 35.4 | 95 | 107 | 6 | 7 | 38.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 14 | 16 | 9 | 8 | 5 | 7 | 5 | 6.5 | 34.9 | 34.0 | 34.0 | 5 | 12 | 33.0 | 5 | 12 | 21.5 | 5 | 7.5 | 5 | 7.5 | 35.6 | 96 | 108 | 6 | 7 | 38.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 15 | 17 | 9 | 8 | 5 | 7 | 5 | 6 | 40.0 | 35.0 | 35.0 | 6 | 16 | 41.5 | 6 | 16 | 29.5 | 5 | 7.5 | 5 | 7.5 | 36.0 | 97 | 109 | 6 | 7.5 | 38.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 15 | 17 | 10 | 8 | 5 | 6.5 | 5 | 7 | 40.5 | 35.0 | 35.0 | 6 | 16 | 41.5 | 6 | 16 | 30.0 | 5 | 6.5 | 5 | 7.5 | 36.0 | 97 | 109 | 6 | 7 | 38.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 16 | 18 | 10 | 8 | 5 | 6.5 | 5 | 6.5 | 40.6 | 36.0 | 36.0 | 6 | 15 | 41.0 | 6 | 15 | 29.5 | 5 | 7 | 5 | 7.5 | 36.4 | 98 | 110 | 6 | 7 | 38.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 16 | 19 | 11 | 8 | 5 | 6 | 5 | 7 | 41.3 | 32.0 | 36.0 | 6 | 15 | 40.5 | 6 | 15 | 29.5 | 5 | 7 | 5 | 7 | 36.8 | 99 | 111 | 6 | 7 | 38.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 17 | 19 | 11 | 8 | 5 | 6 | 5 | 7 | 41.3 | 33.0 | 37.0 | 6 | 15 | 40.0 | 6 | 15 | 29.0 | 5 | 6.5 | 5 | 7 | 36.8 | 99 | 111 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 17 | 20 | 11 | 8 | 5 | 6 | 5 | 6.5 | 41.4 | 37.0 | 37.0 | 6 | 15 | 40.0 | 6 | 15 | 29.0 | 5 | 6.5 | 5 | 7 | 36.9 | 100 | 112 | 6 | 7 | 38.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 18 | 20 | 11 | 8 | 6 | 8.5 | 5 | 6 | 41.4 | 38.0 | 38.0 | 6 | 16 | 39.5 | 6 | 16 | 29.0 | 5 | 6.5 | 5 | 7 | 37.0 | 100 | 112 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 18 | 21 | 12 | 8 | 6 | 8 | 5 | 6.5 | 42.1 | 38.0 | 38.0 | 6 | 15 | 39.5 | 6 | 15 | 29.0 | 5 | 6.5 | 5 | 7 | 37.4 | 101 | 113 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 19 | 21 | 12 | 8 | 6 | 8 | 5 | 6.5 | 42.0 | 39.0 | 39.0 | 6 | 16 | 39.0 | 6 | 16 | 29.0 | 5 | 6 | 5 | 6.5 | 37.5 | 101 | 113 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 19 | 22 | 12 | 8 | 6 | 7.5 | 5 | 6 | 42.1 | 39.0 | 39.0 | 6 | 15 | 39.0 | 6 | 15 | 29.0 | 5 | 6 | 5 | 6.5 | 37.6 | 102 | 114 | 6 | 6.5 | 38.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|------|---------|------------------|------|---------|------|---------|------|------|-------|-------|-------|---------|------|-----------|------------------------------------|------|---------|------|----|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | |
| | | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 8 | 5 | 7 | 4 | 8.5 | 41.8 | 28.0 | 28.0 | 28.0 | 4 | 12 | 81.5 | 4 | 12 | 26.5 | 4 | 7 | 4 | 8 | 43.0 | 53 | 65 | 77 | 5 | 6.5 | 41.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 2 FT | 13 | 9 | 8 | 8 | 5 | 7.5 | 4 | 7.5 | 41.8 | 29.0 | 29.0 | 29.0 | 4 | 13 | 81.5 | 4 | 13 | 26.5 | 4 | 6.5 | 4 | 7 | 39.1 | 53 | 65 | 77 | 5 | 6 | 40.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 6 | 5 | 6.5 | 36.4 | 24.0 | 24.0 | 24.0 | 5 | 15 | 51.0 | 5 | 15 | 26.5 | 4 | 6 | 4 | 6 | 35.3 | 52 | 64 | 76 | 6 | 6.5 | 42.5 | 5 | 9.5 | 5 | 12 | 12 | | | | | | | | | | |
| 6 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 6.5 | 34.3 | 24.0 | 24.0 | 24.0 | 5 | 15 | 42.5 | 5 | 15 | 26.0 | 4 | 6 | 4 | 7.5 | 33.1 | 53 | 65 | 77 | 6 | 7 | 42.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 8 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 6 | 33.1 | 24.0 | 24.0 | 24.0 | 5 | 13 | 40.5 | 5 | 13 | 25.5 | 5 | 8.5 | 4 | 7 | 31.6 | 53 | 65 | 77 | 6 | 6.5 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 10 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 4 | 6 | 31.9 | 25.0 | 25.0 | 25.0 | 5 | 14 | 39.5 | 5 | 14 | 25.5 | 5 | 8 | 4 | 8 | 30.4 | 54 | 66 | 78 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 12 FT | 10 | 11 | 8 | 8 | 5 | 8 | 4 | 6 | 30.6 | 26.0 | 26.0 | 26.0 | 5 | 14 | 39.0 | 5 | 14 | 25.0 | 5 | 8 | 4 | 8 | 29.3 | 55 | 67 | 79 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 14 FT | 11 | 12 | 8 | 8 | 5 | 8 | 4 | 6 | 29.8 | 27.0 | 27.0 | 27.0 | 5 | 14 | 38.5 | 5 | 14 | 25.0 | 5 | 7.5 | 4 | 7.5 | 28.6 | 56 | 68 | 80 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 16 FT | 11 | 13 | 8 | 8 | 5 | 7.5 | 5 | 8.5 | 29.6 | 27.0 | 27.0 | 27.0 | 5 | 12 | 38.5 | 5 | 12 | 25.0 | 5 | 7.5 | 4 | 8 | 28.0 | 57 | 69 | 81 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 18 FT | 12 | 13 | 8 | 8 | 5 | 7.5 | 4 | 6 | 27.5 | 28.0 | 28.0 | 28.0 | 5 | 13 | 37.5 | 5 | 13 | 25.0 | 5 | 7 | 4 | 7.5 | 26.8 | 57 | 69 | 81 | 6 | 7 | 41.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 20 FT | 12 | 14 | 8 | 8 | 5 | 7 | 5 | 8.5 | 27.8 | 28.0 | 28.0 | 28.0 | 5 | 12 | 37.5 | 5 | 12 | 25.0 | 5 | 7 | 4 | 7.5 | 26.4 | 58 | 70 | 82 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 22 FT | 13 | 15 | 8 | 8 | 5 | 6.5 | 6 | 8.5 | 27.4 | 29.0 | 29.0 | 29.0 | 5 | 12 | 37.5 | 5 | 12 | 25.0 | 5 | 7 | 4 | 7 | 26.4 | 59 | 71 | 83 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 24 FT | 14 | 16 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 27.3 | 30.0 | 30.0 | 30.0 | 5 | 12 | 37.5 | 5 | 12 | 24.5 | 5 | 7 | 4 | 6.5 | 26.5 | 60 | 72 | 84 | 6 | 7 | 41.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 26 FT | 15 | 16 | 8 | 8 | 5 | 6.5 | 5 | 8 | 31.9 | 31.0 | 31.0 | 31.0 | 6 | 16 | 46.5 | 6 | 16 | 33.0 | 5 | 6.5 | 4 | 6.5 | 26.6 | 60 | 72 | 84 | 6 | 7 | 41.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 28 FT | 16 | 17 | 8 | 8 | 5 | 6 | 5 | 7 | 31.8 | 32.0 | 32.0 | 32.0 | 6 | 15 | 46.0 | 6 | 15 | 32.0 | 5 | 6.5 | 4 | 6 | 26.8 | 61 | 73 | 85 | 6 | 6.5 | 41.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 30 FT | 16 | 18 | 8 | 8 | 5 | 6 | 5 | 7 | 32.0 | 32.0 | 32.0 | 36.0 | 6 | 15 | 46.0 | 6 | 15 | 33.0 | 5 | 6.5 | 5 | 6.5 | 26.6 | 62 | 74 | 86 | 6 | 6.5 | 41.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 32 FT | 17 | 19 | 8 | 8 | 5 | 6 | 5 | 6.5 | 31.9 | 37.0 | 37.0 | 37.0 | 6 | 14 | 45.5 | 6 | 14 | 32.0 | 5 | 6.5 | 5 | 6.5 | 26.8 | 63 | 75 | 87 | 6 | 6.5 | 41.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 34 FT | 18 | 19 | 8 | 8 | 6 | 8.5 | 5 | 6.5 | 31.8 | 38.0 | 38.0 | 38.0 | 6 | 13 | 45.5 | 6 | 13 | 31.0 | 5 | 6 | 5 | 6.5 | 26.9 | 63 | 75 | 87 | 6 | 6 | 41.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | |
| 36 FT | 18 | 20 | 8 | 8 | 6 | 8 | 5 | 6.5 | 31.9 | 38.0 | 38.0 | 38.0 | 6 | 13 | 45.5 | 6 | 13 | 32.0 | 5 | 6 | 5 | 6 | 26.9 | 64 | 76 | 88 | 6 | 6 | 41.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | |
| 38 FT | 19 | 21 | 8 | 8 | 6 | 8 | 5 | 6 | 32.0 | 39.0 | 39.0 | 39.0 | 6 | 13 | 45.0 | 6 | 13 | 31.0 | 5 | 6 | 6 | 7.5 | 30.1 | 65 | 77 | 89 | 6 | 6 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 40 FT | 20 | 22 | 8 | 8 | 6 | 7.5 | 6 | 7.5 | 36.0 | 44.0 | 44.0 | 44.0 | 6 | 13 | 44.5 | 6 | 13 | 30.5 | 5 | 6 | 6 | 7 | 30.4 | 66 | 78 | 90 | 6 | 6 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 42 FT | 20 | 22 | 8 | 8 | 6 | 7.5 | 6 | 7.5 | 36.0 | 44.0 | 44.0 | 44.0 | 6 | 12 | 44.5 | 6 | 12 | 30.5 | 6 | 8.5 | 6 | 7 | 30.3 | 66 | 78 | 90 | 6 | 6 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 44 FT | 21 | 23 | 8 | 8 | 6 | 7.5 | 6 | 7 | 36.0 | 45.0 | 45.0 | 45.0 | 6 | 12 | 43.5 | 6 | 12 | 30.0 | 6 | 8.5 | 6 | 6.5 | 30.5 | 67 | 79 | 91 | 6 | 6 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 46 FT | 21 | 23 | 8 | 8 | 6 | 7 | 6 | 7 | 36.0 | 45.0 | 45.0 | 45.0 | 6 | 12 | 43.5 | 6 | 12 | 30.0 | 6 | 8 | 6 | 6.5 | 30.5 | 67 | 79 | 91 | 7 | 7.5 | 44.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 48 FT | 22 | 24 | 8 | 8 | 6 | 7 | 6 | 6.5 | 36.1 | 46.0 | 46.0 | 46.0 | 6 | 12 | 43.0 | 6 | 12 | 30.0 | 6 | 8 | 6 | 6 | 30.8 | 68 | 80 | 92 | 7 | 7.5 | 44.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | |
| 50 FT | 22 | 24 | 8 | 8 | 6 | 6.5 | 6 | 6.5 | 36.1 | 46.0 | 46.0 | 46.0 | 6 | 12 | 43.0 | 6 | 12 | 30.0 | 6 | 7.5 | 6 | 6 | 30.8 | 68 | 80 | 92 | 7 | 7.5 | 44.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------|---------|------|------------------|---------|------|---------|----|-------|-------|-------|---------|------|----|------|-----------|------|------------------------------------|----|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | H3 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 8 | 5 | 7 | 4 | 6.5 | 41.8 | 28.0 | 28.0 | 28.0 | 4 | 12 | 81.5 | 4 | 12 | 27.5 | 4 | 6 | 5 | 6.5 | 61.6 | 89 | 101 | 113 | 5 | 6 | 41.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 13 | 10 | 8 | 8 | 5 | 7 | 4 | 6.5 | 41.8 | 29.0 | 29.0 | 29.0 | 4 | 13 | 81.5 | 4 | 13 | 27.0 | 4 | 6.5 | 4 | 6 | 58.3 | 90 | 102 | 114 | 5 | 6.5 | 40.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 9 | 8 | 8 | 4 | 6 | 6 | 7.5 | 43.8 | 24.0 | 24.0 | 28.0 | 5 | 15 | 83.5 | 5 | 15 | 27.0 | 4 | 6 | 5 | 6 | 52.3 | 89 | 101 | 113 | 5 | 6 | 40.0 | 5 | 11 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 10 | 8 | 8 | 4 | 6 | 6 | 7.5 | 51.4 | 24.0 | 24.0 | 28.0 | 5 | 15 | 43.0 | 5 | 15 | 26.0 | 4 | 6.5 | 5 | 6 | 49.0 | 90 | 102 | 114 | 5 | 6.5 | 39.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 11 | 8 | 8 | 4 | 6 | 6 | 7.5 | 46.6 | 24.0 | 24.0 | 28.0 | 5 | 13 | 40.5 | 5 | 13 | 25.5 | 4 | 6.5 | 5 | 6.5 | 46.3 | 91 | 103 | 115 | 5 | 6 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 9 | 11 | 8 | 8 | 5 | 8.5 | 6 | 7 | 45.3 | 25.0 | 25.0 | 29.0 | 5 | 14 | 39.5 | 5 | 14 | 25.5 | 5 | 8.5 | 5 | 6 | 43.6 | 91 | 103 | 115 | 5 | 6 | 38.5 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 10 | 12 | 8 | 8 | 5 | 8 | 6 | 7 | 44.4 | 26.0 | 30.0 | 30.0 | 5 | 14 | 39.0 | 5 | 14 | 25.0 | 5 | 8.5 | 5 | 6 | 42.5 | 92 | 104 | 116 | 5 | 6 | 38.5 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 11 | 12 | 8 | 8 | 5 | 8 | 6 | 7 | 43.5 | 27.0 | 31.0 | 35.0 | 5 | 14 | 38.5 | 5 | 14 | 25.0 | 5 | 7.5 | 6 | 7 | 44.4 | 92 | 104 | 116 | 6 | 7 | 41.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 11 | 13 | 8 | 8 | 5 | 7.5 | 6 | 6.5 | 42.9 | 27.0 | 31.0 | 35.0 | 5 | 12 | 38.0 | 5 | 12 | 25.0 | 5 | 7.5 | 6 | 7 | 44.0 | 93 | 105 | 117 | 6 | 7.5 | 41.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 12 | 13 | 8 | 8 | 5 | 7.5 | 5 | 6 | 37.1 | 28.0 | 32.0 | 32.0 | 5 | 13 | 37.5 | 5 | 13 | 25.0 | 5 | 7 | 6 | 7.5 | 41.1 | 93 | 105 | 117 | 6 | 7 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 12 | 14 | 8 | 8 | 5 | 7 | 6 | 7 | 39.9 | 32.0 | 32.0 | 36.0 | 5 | 12 | 37.5 | 5 | 12 | 25.0 | 5 | 7 | 6 | 7.5 | 41.1 | 94 | 106 | 118 | 6 | 7 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 13 | 15 | 8 | 8 | 5 | 6.5 | 6 | 7 | 39.9 | 33.0 | 33.0 | 37.0 | 5 | 12 | 37.0 | 5 | 12 | 25.0 | 5 | 7 | 6 | 7.5 | 41.3 | 95 | 107 | 119 | 6 | 7 | 41.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 14 | 16 | 8 | 8 | 5 | 6.5 | 6 | 7 | 40.0 | 34.0 | 34.0 | 38.0 | 5 | 12 | 37.0 | 5 | 12 | 24.0 | 5 | 7 | 6 | 7 | 41.4 | 96 | 108 | 120 | 6 | 7 | 41.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 15 | 16 | 9 | 8 | 5 | 6.5 | 5 | 6 | 42.4 | 35.0 | 35.0 | 35.0 | 6 | 16 | 45.5 | 6 | 16 | 32.0 | 5 | 6.5 | 5 | 6 | 38.5 | 96 | 108 | 120 | 6 | 7 | 41.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 15 | 17 | 10 | 8 | 5 | 6 | 5 | 6.5 | 42.9 | 31.0 | 35.0 | 35.0 | 6 | 16 | 45.5 | 6 | 16 | 33.0 | 5 | 6.5 | 5 | 7.5 | 38.8 | 97 | 109 | 121 | 6 | 6.5 | 41.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 16 | 18 | 11 | 8 | 5 | 6 | 5 | 6.5 | 43.6 | 32.0 | 36.0 | 36.0 | 6 | 15 | 44.5 | 6 | 15 | 31.5 | 5 | 6.5 | 5 | 7 | 39.1 | 98 | 110 | 122 | 6 | 6.5 | 41.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 17 | 19 | 11 | 8 | 5 | 6 | 5 | 6.5 | 43.6 | 33.0 | 37.0 | 37.0 | 6 | 14 | 44.0 | 6 | 14 | 31.0 | 5 | 6.5 | 5 | 7 | 39.4 | 99 | 111 | 123 | 6 | 6 | 41.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 17 | 20 | 11 | 8 | 6 | 8 | 5 | 6 | 43.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 44.0 | 6 | 14 | 31.5 | 5 | 6.5 | 5 | 7 | 39.5 | 100 | 112 | 124 | 6 | 6 | 41.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 18 | 20 | 12 | 8 | 6 | 8 | 5 | 6.5 | 44.3 | 38.0 | 38.0 | 38.0 | 6 | 13 | 43.5 | 6 | 13 | 30.5 | 5 | 6 | 5 | 6.5 | 39.6 | 100 | 112 | 124 | 6 | 6 | 41.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 18 | 21 | 12 | 8 | 6 | 7.5 | 5 | 6 | 44.4 | 38.0 | 38.0 | 38.0 | 6 | 13 | 43.5 | 6 | 13 | 31.0 | 5 | 6 | 5 | 6.5 | 39.9 | 101 | 113 | 125 | 6 | 6 | 41.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 19 | 22 | 12 | 8 | 6 | 7.5 | 6 | 8.5 | 48.4 | 39.0 | 39.0 | 39.0 | 6 | 13 | 42.5 | 6 | 13 | 30.0 | 5 | 6 | 5 | 6.5 | 40.1 | 102 | 114 | 126 | 6 | 6 | 41.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 19 | 22 | 13 | 8 | 6 | 7 | 5 | 6 | 45.0 | 39.0 | 39.0 | 39.0 | 6 | 13 | 42.5 | 6 | 13 | 30.5 | 6 | 8 | 5 | 6.5 | 40.3 | 102 | 114 | 126 | 7 | 7.5 | 44.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 20 | 23 | 13 | 8 | 6 | 7 | 6 | 8.5 | 49.1 | 40.0 | 40.0 | 40.0 | 6 | 13 | 42.0 | 6 | 13 | 30.0 | 6 | 8 | 5 | 6 | 40.5 | 103 | 115 | 127 | 7 | 7.5 | 44.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 20 | 24 | 13 | 8 | 6 | 6.5 | 6 | 8 | 49.3 | 40.0 | 40.0 | 40.0 | 6 | 12 | 42.0 | 6 | 12 | 30.0 | 6 | 8 | 5 | 6 | 40.6 | 104 | 116 | 128 | 7 | 7.5 | 44.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 21 | 24 | 13 | 8 | 6 | 7 | 6 | 7.5 | 49.1 | 41.0 | 41.0 | 41.0 | 6 | 13 | 41.5 | 6 | 13 | 29.5 | 6 | 8 | 5 | 6 | 40.8 | 104 | 116 | 128 | 7 | 7.5 | 44.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 21 | 25 | 14 | 8 | 6 | 6.5 | 6 | 8 | 49.9 | 41.0 | 41.0 | 41.0 | 6 | 13 | 41.5 | 6 | 13 | 29.5 | 6 | 8 | 5 | 6.5 | 41.1 | 105 | 117 | 129 | 7 | 7.5 | 44.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|--------|--------|--------|---------------|------|---------|------|------|------|---------|------|------|------|---------|------|------|------|---------|----|------------------|------|------|------|---------|------|------|------------------------------|---------|------|---------|----|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | C8 | SIZE | SPA. | C9 | G1 | | | | | | | | | | | | | | | | | | | | | | | |
| | HT=10' | HT=11' | HT=10' | HT=11' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 9 | 5 | 7 | 5 | 7.5 | 41.9 | 32.0 | 32.0 | 4 | 12 | 81.5 | 4 | 12 | 27.5 | 5 | 9 | 6 | 6 | 73.9 | 125 | 137 | 5 | 6 | 41.5 | 5 | 12 | 5 | 10.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 13 | 10 | 9 | 9 | 5 | 7 | 5 | 8 | 42.5 | 29.0 | 33.0 | 4 | 13 | 82.0 | 4 | 13 | 27.0 | 4 | 6 | 5 | 6 | 66.8 | 126 | 138 | 5 | 6.5 | 41.0 | 5 | 12 | 5 | 11 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 11 | 9 | 9 | 4 | 6 | 6 | 7 | 44.5 | 24.0 | 28.0 | 5 | 16 | 84.0 | 5 | 16 | 27.0 | 4 | 7 | 5 | 6 | 66.0 | 127 | 139 | 5 | 7.5 | 41.0 | 5 | 10.5 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 11 | 9 | 9 | 4 | 6 | 6 | 7 | 61.5 | 28.0 | 32.0 | 5 | 15 | 43.0 | 5 | 15 | 26.0 | 4 | 6.5 | 6 | 7 | 64.5 | 127 | 139 | 5 | 7 | 40.0 | 5 | 11.5 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 11 | 9 | 9 | 4 | 6 | 6 | 7 | 55.6 | 28.0 | 32.0 | 5 | 14 | 40.5 | 5 | 14 | 25.5 | 4 | 6 | 6 | 6.5 | 60.4 | 127 | 139 | 5 | 6 | 39.5 | 5 | 11.5 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 9 | 11 | 9 | 9 | 5 | 8.5 | 6 | 7.5 | 54.9 | 29.0 | 33.0 | 5 | 14 | 39.5 | 5 | 14 | 25.5 | 5 | 8.5 | 6 | 6 | 57.5 | 127 | 139 | 5 | 6 | 39.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 10 | 11 | 9 | 9 | 5 | 8 | 5 | 6 | 51.1 | 30.0 | 30.0 | 5 | 14 | 39.0 | 5 | 14 | 25.5 | 5 | 7.5 | 6 | 6 | 55.3 | 127 | 139 | 6 | 7 | 41.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 10 | 12 | 9 | 9 | 5 | 8 | 6 | 6.5 | 52.0 | 30.0 | 34.0 | 5 | 13 | 38.5 | 5 | 13 | 25.5 | 5 | 7.5 | 6 | 6 | 54.8 | 128 | 140 | 6 | 7 | 41.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 11 | 13 | 10 | 9 | 5 | 7.5 | 5 | 6 | 48.6 | 31.0 | 31.0 | 5 | 13 | 38.0 | 5 | 13 | 25.5 | 5 | 7.5 | 6 | 6.5 | 54.1 | 129 | 141 | 6 | 7.5 | 41.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 11 | 13 | 10 | 9 | 5 | 7.5 | 5 | 6 | 45.1 | 31.0 | 31.0 | 5 | 12 | 37.0 | 5 | 12 | 25.0 | 5 | 7 | 6 | 6.5 | 50.4 | 129 | 141 | 6 | 7 | 41.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 12 | 14 | 10 | 9 | 5 | 7 | 6 | 7.5 | 48.4 | 32.0 | 36.0 | 5 | 13 | 37.0 | 5 | 13 | 25.0 | 5 | 7 | 6 | 6.5 | 50.5 | 130 | 142 | 6 | 7.5 | 41.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 13 | 15 | 10 | 9 | 5 | 7 | 6 | 7 | 48.5 | 33.0 | 37.0 | 5 | 12 | 37.0 | 5 | 12 | 24.5 | 5 | 7 | 6 | 6.5 | 50.6 | 131 | 143 | 6 | 7 | 41.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 13 | 16 | 11 | 9 | 5 | 6.5 | 6 | 8 | 48.5 | 33.0 | 33.0 | 5 | 12 | 36.5 | 5 | 12 | 25.0 | 5 | 7 | 5 | 6 | 47.8 | 132 | 144 | 6 | 7 | 41.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 14 | 16 | 12 | 9 | 5 | 6.5 | 5 | 6 | 46.0 | 34.0 | 34.0 | 5 | 12 | 36.0 | 5 | 12 | 24.5 | 5 | 6 | 5 | 6 | 47.5 | 132 | 144 | 6 | 7 | 41.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 15 | 17 | 12 | 9 | 5 | 6.5 | 6 | 8 | 55.3 | 35.0 | 35.0 | 6 | 16 | 44.5 | 6 | 16 | 32.5 | 5 | 6.5 | 5 | 6 | 47.8 | 133 | 145 | 6 | 6.5 | 41.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 16 | 18 | 13 | 9 | 5 | 6.5 | 6 | 8 | 55.8 | 36.0 | 36.0 | 6 | 15 | 44.0 | 6 | 15 | 31.5 | 5 | 6.5 | 5 | 6 | 48.0 | 134 | 146 | 6 | 6.5 | 41.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 16 | 19 | 13 | 9 | 5 | 6 | 6 | 7.5 | 55.8 | 36.0 | 36.0 | 6 | 15 | 44.0 | 6 | 15 | 32.0 | 5 | 6.5 | 5 | 6 | 48.3 | 135 | 147 | 6 | 6 | 41.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 17 | 20 | 13 | 9 | 5 | 6 | 6 | 7 | 56.0 | 37.0 | 37.0 | 6 | 14 | 43.5 | 6 | 14 | 31.0 | 5 | 6.5 | 5 | 6 | 48.5 | 136 | 148 | 6 | 6.5 | 41.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 17 | 20 | 14 | 9 | 6 | 8 | 6 | 7.5 | 56.1 | 37.0 | 37.0 | 6 | 14 | 43.0 | 6 | 14 | 31.5 | 5 | 6 | 5 | 6 | 48.6 | 136 | 148 | 6 | 6 | 41.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 18 | 21 | 14 | 9 | 6 | 8 | 6 | 7 | 56.4 | 38.0 | 38.0 | 6 | 13 | 42.5 | 6 | 13 | 30.5 | 5 | 6 | 5 | 6 | 48.9 | 137 | 149 | 6 | 6 | 41.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 18 | 22 | 15 | 9 | 6 | 7 | 6 | 7.5 | 56.8 | 38.0 | 42.0 | 6 | 13 | 42.5 | 6 | 13 | 30.5 | 5 | 6 | 6 | 8 | 52.3 | 138 | 150 | 6 | 6 | 41.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 19 | 22 | 15 | 9 | 6 | 7.5 | 6 | 7 | 57.0 | 39.0 | 43.0 | 6 | 14 | 42.0 | 6 | 14 | 30.0 | 6 | 8.5 | 6 | 8 | 52.3 | 138 | 150 | 7 | 7.5 | 44.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 19 | 23 | 15 | 9 | 6 | 6.5 | 6 | 6.5 | 56.9 | 39.0 | 43.0 | 6 | 13 | 42.0 | 6 | 13 | 30.0 | 6 | 8.5 | 6 | 8 | 52.5 | 139 | 151 | 7 | 8 | 44.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 20 | 24 | 16 | 9 | 6 | 7 | 6 | 7 | 57.6 | 40.0 | 44.0 | 6 | 14 | 41.5 | 6 | 14 | 30.0 | 6 | 8 | 6 | 7.5 | 52.9 | 140 | 152 | 7 | 8 | 44.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 20 | 24 | 16 | 9 | 6 | 6.5 | 6 | 6.5 | 57.5 | 40.0 | 44.0 | 6 | 13 | 41.5 | 6 | 13 | 30.0 | 6 | 8 | 6 | 7.5 | 52.9 | 140 | 152 | 7 | 7.5 | 44.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 21 | 25 | 16 | 9 | 6 | 6.5 | 6 | 6 | 57.8 | 41.0 | 45.0 | 6 | 14 | 41.0 | 6 | 14 | 30.0 | 6 | 8 | 6 | 7.5 | 53.1 | 141 | 153 | 7 | 7.5 | 44.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.


DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



**CONCRETE
DOUBLE BOX CULVERT**

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 8 FEET
HEIGHT (HT): 10 THRU 11 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

SHEET NO.
11 OF 27

703.47

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|---------|------|---------|------|------------------|------|------|------|---------|------|------|---------|-------|---------|------|------|-----------|------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 4 | 7.5 | 45.3 | 29.0 | 29.0 | 29.0 | 5 | 17 | 89.5 | 5 | 17 | 28.5 | 4 | 6 | 4 | 6 | 47.3 | 65 | 77 | 89 | 5 | 6 | 44.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 2 FT | 13 | 10 | 8 | 8 | 5 | 6.5 | 4 | 7.5 | 45.3 | 29.0 | 29.0 | 29.0 | 5 | 16 | 89.5 | 5 | 16 | 27.5 | 4 | 6 | 4 | 7.5 | 44.5 | 66 | 78 | 90 | 5 | 6.5 | 44.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 4 FT | 9 | 9 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 42.1 | 25.0 | 25.0 | 25.0 | 5 | 15 | 59.0 | 5 | 15 | 28.5 | 5 | 8 | 4 | 6 | 39.5 | 65 | 77 | 89 | 6 | 6.5 | 46.0 | 5 | 11 | 5 | 12 | 12 | | | | | | | | | | |
| 6 FT | 9 | 9 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 36.9 | 25.0 | 25.0 | 29.0 | 5 | 14 | 47.0 | 5 | 14 | 27.5 | 5 | 7.5 | 5 | 7 | 36.5 | 65 | 77 | 89 | 6 | 6 | 45.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 8 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 35.6 | 25.0 | 25.0 | 25.0 | 5 | 12 | 44.0 | 5 | 12 | 27.0 | 5 | 7.5 | 4 | 6.5 | 34.6 | 66 | 78 | 90 | 6 | 6.5 | 45.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 10 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 7.5 | 34.3 | 26.0 | 26.0 | 26.0 | 5 | 12 | 43.0 | 5 | 12 | 26.5 | 5 | 7.5 | 4 | 6.5 | 33.3 | 67 | 79 | 91 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 12 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 8.5 | 33.0 | 27.0 | 27.0 | 27.0 | 5 | 12 | 42.5 | 5 | 12 | 26.5 | 5 | 7 | 4 | 6 | 32.1 | 68 | 80 | 92 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 14 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 8.5 | 32.1 | 28.0 | 28.0 | 28.0 | 5 | 12 | 42.0 | 5 | 12 | 26.5 | 5 | 6.5 | 4 | 6 | 31.5 | 69 | 81 | 93 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 16 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 31.5 | 29.0 | 29.0 | 33.0 | 6 | 16 | 44.5 | 6 | 16 | 29.5 | 5 | 6.5 | 5 | 8.5 | 31.0 | 70 | 82 | 94 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 18 FT | 13 | 15 | 8 | 8 | 5 | 6.5 | 5 | 8 | 31.3 | 29.0 | 29.0 | 33.0 | 6 | 15 | 44.5 | 6 | 15 | 29.5 | 5 | 6.5 | 5 | 8.5 | 30.5 | 71 | 83 | 95 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 20 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8.5 | 29.3 | 30.0 | 30.0 | 34.0 | 6 | 16 | 43.5 | 6 | 16 | 29.0 | 5 | 6 | 5 | 8.5 | 29.1 | 71 | 83 | 95 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 22 FT | 15 | 16 | 8 | 8 | 5 | 6 | 5 | 8 | 34.1 | 31.0 | 31.0 | 35.0 | 6 | 15 | 49.5 | 6 | 15 | 35.0 | 5 | 6 | 5 | 8 | 29.1 | 72 | 84 | 96 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 24 FT | 15 | 17 | 8 | 8 | 6 | 7.5 | 5 | 8 | 34.3 | 31.0 | 31.0 | 35.0 | 6 | 14 | 49.5 | 6 | 14 | 35.0 | 5 | 6 | 5 | 7 | 28.9 | 73 | 85 | 97 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 26 FT | 16 | 18 | 8 | 8 | 6 | 8 | 5 | 7 | 34.1 | 32.0 | 36.0 | 36.0 | 6 | 14 | 49.0 | 6 | 14 | 35.0 | 5 | 6 | 5 | 6.5 | 29.0 | 74 | 86 | 98 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | |
| 28 FT | 17 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 34.0 | 37.0 | 37.0 | 37.0 | 6 | 14 | 49.0 | 6 | 14 | 35.0 | 5 | 6 | 5 | 6.5 | 29.1 | 75 | 87 | 99 | 6 | 6 | 44.5 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | |
| 30 FT | 18 | 20 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 34.0 | 38.0 | 38.0 | 38.0 | 6 | 13 | 48.5 | 6 | 13 | 34.0 | 6 | 8.5 | 5 | 6 | 29.3 | 76 | 88 | 100 | 6 | 6 | 44.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 32 FT | 19 | 21 | 8 | 8 | 6 | 7.5 | 5 | 6 | 34.1 | 39.0 | 39.0 | 39.0 | 6 | 13 | 48.0 | 6 | 13 | 33.0 | 6 | 8.5 | 6 | 7.5 | 32.5 | 77 | 89 | 101 | 7 | 7.5 | 47.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 34 FT | 20 | 21 | 8 | 8 | 6 | 7.5 | 6 | 7.5 | 38.0 | 44.0 | 44.0 | 44.0 | 6 | 12 | 47.5 | 6 | 12 | 32.5 | 6 | 7.5 | 6 | 7.5 | 32.6 | 77 | 89 | 101 | 7 | 7.5 | 47.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 36 FT | 20 | 22 | 8 | 8 | 6 | 7 | 6 | 7.5 | 38.0 | 44.0 | 44.0 | 44.0 | 6 | 12 | 47.5 | 6 | 12 | 33.0 | 6 | 8 | 6 | 7 | 32.6 | 78 | 90 | 102 | 7 | 7.5 | 47.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 38 FT | 21 | 23 | 8 | 8 | 6 | 7 | 6 | 7 | 38.1 | 45.0 | 45.0 | 45.0 | 6 | 12 | 47.0 | 6 | 12 | 32.0 | 6 | 7.5 | 6 | 6.5 | 32.8 | 79 | 91 | 103 | 7 | 7 | 47.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | |
| 40 FT | 22 | 24 | 8 | 8 | 6 | 6.5 | 6 | 6.5 | 38.3 | 46.0 | 46.0 | 46.0 | 7 | 15 | 51.5 | 7 | 15 | 36.0 | 6 | 7.5 | 6 | 6 | 33.0 | 80 | 92 | 104 | 7 | 7 | 47.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 42 FT | 22 | 24 | 8 | 8 | 6 | 6.5 | 6 | 6 | 38.1 | 46.0 | 46.0 | 46.0 | 7 | 15 | 51.5 | 7 | 15 | 36.5 | 6 | 7.5 | 6 | 6 | 33.0 | 80 | 92 | 104 | 7 | 7 | 47.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | |
| 44 FT | 23 | 25 | 9 | 8 | 6 | 6.5 | 6 | 7 | 39.0 | 47.0 | 47.0 | 47.0 | 7 | 15 | 50.5 | 7 | 15 | 36.0 | 6 | 7.5 | 6 | 7 | 33.5 | 81 | 93 | 105 | 7 | 7 | 47.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | |
| 46 FT | 24 | 26 | 9 | 8 | 6 | 6 | 6 | 7 | 39.0 | 48.0 | 48.0 | 48.0 | 7 | 15 | 49.5 | 7 | 15 | 35.5 | 6 | 7.5 | 6 | 6.5 | 33.8 | 82 | 94 | 106 | 7 | 7 | 47.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 48 FT | 24 | 26 | 9 | 8 | 6 | 6 | 6 | 7 | 39.0 | 48.0 | 48.0 | 48.0 | 7 | 15 | 49.5 | 7 | 15 | 35.5 | 6 | 6.5 | 6 | 6.5 | 33.8 | 82 | 94 | 106 | 7 | 6.5 | 47.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 50 FT | 25 | 27 | 9 | 8 | 6 | 6 | 6 | 6.5 | 39.0 | 49.0 | 49.0 | 49.0 | 7 | 15 | 49.0 | 7 | 15 | 35.5 | 6 | 7 | 6 | 6.5 | 34.0 | 83 | 95 | 107 | 7 | 6.5 | 47.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | |

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|--------|---------|------|---------|------|------------------|------|------|------|---------|------|---------|-------|---------|--------|------|------|-----------|-------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 10 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 47.3 | 29.0 | 29.0 | 33.0 | 5 | 18 | 91.5 | 5 | 18 | 29.0 | 4 | 6 | 5 | 6 | 69.0 | 102 | 114 | 126 | 5 | 6.5 | 44.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 13 | 10 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 47.3 | 29.0 | 29.0 | 33.0 | 5 | 17 | 91.5 | 5 | 17 | 28.0 | 5 | 9 | 6 | 7 | 66.6 | 102 | 114 | 126 | 5 | 6 | 44.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 9 | 9 | 8 | 8 | 5 | 8.5 | 6 | 7 | 47.3 | 29.0 | 33.0 | 33.0 | 5 | 15 | 91.5 | 5 | 15 | 29.0 | 5 | 7.5 | 6 | 6 | 59.4 | 101 | 113 | 125 | 6 | 6 | 46.0 | 5 | 12 | 5 | 10.5 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 9 | 10 | 9 | 8 | 5 | 8.5 | 5 | 6 | 54.1 | 25.0 | 25.0 | 29.0 | 5 | 14 | 48.0 | 5 | 14 | 27.5 | 5 | 8 | 5 | 6 | 51.8 | 102 | 114 | 126 | 6 | 6.5 | 45.5 | 5 | 12 | 5 | 11.5 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 9 | 11 | 9 | 8 | 5 | 8.5 | 5 | 6 | 48.0 | 25.0 | 29.0 | 29.0 | 5 | 13 | 44.0 | 5 | 13 | 27.0 | 5 | 8 | 5 | 6 | 49.3 | 103 | 115 | 127 | 6 | 7 | 45.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 10 | 11 | 9 | 8 | 5 | 8 | 5 | 6 | 46.6 | 26.0 | 30.0 | 30.0 | 5 | 12 | 43.0 | 5 | 12 | 26.5 | 5 | 7 | 6 | 7 | 50.0 | 103 | 115 | 127 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 11 | 12 | 9 | 8 | 5 | 7.5 | 6 | 7 | 48.4 | 31.0 | 31.0 | 35.0 | 5 | 12 | 42.0 | 5 | 12 | 26.5 | 5 | 7 | 6 | 7 | 49.0 | 104 | 116 | 128 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 12 | 13 | 9 | 8 | 5 | 7 | 6 | 7.5 | 47.4 | 32.0 | 32.0 | 36.0 | 5 | 12 | 41.5 | 5 | 12 | 26.5 | 5 | 6.5 | 6 | 7 | 48.1 | 105 | 117 | 129 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 12 | 14 | 9 | 8 | 5 | 7 | 6 | 6.5 | 46.4 | 32.0 | 32.0 | 36.0 | 6 | 15 | 44.5 | 6 | 15 | 29.5 | 5 | 6.5 | 6 | 7 | 47.5 | 106 | 118 | 130 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 13 | 15 | 9 | 8 | 5 | 6.5 | 6 | 6.5 | 46.0 | 33.0 | 33.0 | 37.0 | 6 | 15 | 44.0 | 6 | 15 | 29.0 | 5 | 6.5 | 6 | 7.5 | 47.3 | 107 | 119 | 131 | 6 | 7 | 44.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 14 | 15 | 9 | 8 | 5 | 6.5 | 5 | 6 | 40.1 | 34.0 | 34.0 | 34.0 | 6 | 16 | 43.0 | 6 | 16 | 29.0 | 5 | 6 | 6 | 7.5 | 44.4 | 107 | 119 | 131 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 14 | 16 | 10 | 8 | 5 | 6 | 5 | 6 | 40.5 | 34.0 | 34.0 | 34.0 | 6 | 15 | 43.0 | 6 | 15 | 29.0 | 5 | 6 | 5 | 7 | 41.5 | 108 | 120 | 132 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 15 | 17 | 10 | 8 | 6 | 8 | 6 | 8 | 49.5 | 35.0 | 35.0 | 35.0 | 6 | 15 | 48.5 | 6 | 15 | 35.0 | 5 | 6 | 5 | 6.5 | 41.6 | 109 | 121 | 133 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 16 | 18 | 11 | 8 | 6 | 8 | 5 | 6 | 46.1 | 36.0 | 36.0 | 36.0 | 6 | 15 | 48.0 | 6 | 15 | 34.5 | 5 | 6 | 5 | 7 | 41.9 | 110 | 122 | 134 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 17 | 19 | 11 | 8 | 6 | 8 | 6 | 8 | 50.1 | 37.0 | 37.0 | 37.0 | 6 | 14 | 47.5 | 6 | 14 | 33.5 | 5 | 6 | 5 | 7 | 42.0 | 111 | 123 | 135 | 6 | 6 | 44.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 18 | 20 | 12 | 8 | 6 | 8 | 5 | 6 | 46.8 | 38.0 | 38.0 | 38.0 | 6 | 13 | 47.0 | 6 | 13 | 32.5 | 6 | 8.5 | 5 | 6.5 | 42.4 | 112 | 124 | 136 | 6 | 6 | 44.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 18 | 21 | 12 | 8 | 6 | 7.5 | 6 | 8 | 50.8 | 38.0 | 38.0 | 38.0 | 6 | 13 | 47.0 | 6 | 13 | 33.5 | 6 | 8 | 5 | 6.5 | 42.5 | 113 | 125 | 137 | 7 | 7.5 | 47.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 19 | 22 | 12 | 8 | 6 | 7 | 6 | 7.5 | 50.9 | 39.0 | 39.0 | 39.0 | 6 | 13 | 46.0 | 6 | 13 | 32.5 | 6 | 8 | 5 | 6.5 | 42.8 | 114 | 126 | 138 | 7 | 7.5 | 47.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 20 | 23 | 13 | 8 | 6 | 7 | 6 | 8 | 51.5 | 40.0 | 40.0 | 40.0 | 6 | 12 | 45.0 | 6 | 12 | 31.5 | 6 | 8 | 5 | 6 | 43.1 | 115 | 127 | 139 | 7 | 7 | 47.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 20 | 23 | 13 | 8 | 6 | 6.5 | 6 | 7.5 | 51.4 | 40.0 | 40.0 | 40.0 | 6 | 12 | 45.0 | 6 | 12 | 32.0 | 6 | 7.5 | 5 | 6 | 43.0 | 115 | 127 | 139 | 7 | 7 | 47.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 21 | 24 | 13 | 8 | 6 | 6.5 | 6 | 7 | 51.5 | 41.0 | 41.0 | 41.0 | 6 | 12 | 44.5 | 6 | 12 | 31.0 | 6 | 7.5 | 5 | 6 | 43.3 | 116 | 128 | 140 | 7 | 7 | 47.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 21 | 25 | 14 | 8 | 6 | 6 | 6 | 7.5 | 52.3 | 41.0 | 41.0 | 41.0 | 6 | 12 | 44.5 | 6 | 12 | 31.5 | 6 | 7.5 | 5 | 6 | 43.5 | 117 | 129 | 141 | 7 | 7 | 47.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 22 | 25 | 14 | 8 | 6 | 6.5 | 6 | 7 | 52.1 | 42.0 | 42.0 | 42.0 | 7 | 16 | 49.0 | 7 | 16 | 35.5 | 6 | 6.5 | 5 | 6 | 43.6 | 117 | 129 | 141 | 7 | 6.5 | 47.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 23 | 26 | 14 | 8 | 6 | 6 | 6 | 7 | 52.1 | 43.0 | 43.0 | 43.0 | 6 | 12 | 43.5 | 6 | 12 | 30.5 | 6 | 7 | 5 | 6 | 43.9 | 118 | 130 | 142 | 7 | 6.5 | 47.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 23 | 27 | 15 | 8 | 6 | 6 | 6 | 7 | 53.0 | 43.0 | 43.0 | 47.0 | 6 | 12 | 43.5 | 6 | 12 | 30.0 | 6 | 7 | 6 | 8.5 | 47.1 | 119 | 131 | 143 | 7 | 6.5 | 47.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 24 | 28 | 15 | 8 | 6 | 6 | 6 | 7 | 53.0 | 44.0 | 44.0 | 48.0 | 6 | 12 | 43.0 | 6 | 12 | 30.0 | 6 | 7 | 6 | 8 | 47.5 | 120 | 132 | 144 | 7 | 6.5 | 47.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|--------------------|---------|------|---------|------|---------|------|------------------|------|------|------|---------|------|--------------------|-----|---------|------|------|------------------------------|-----------|------|------|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 HT=11'HT=12' | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 HT=11'HT=12' | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 FT | 13 | 10 | 9 | 10 | 5 | 6.5 | 5 | 8 | 48.3 | 33.0 | 33.0 | 5 | 17 | 93.0 | 5 | 17 | 29.0 | 5 | 9 | 6 | 6.5 | 79.4 | 138 | 150 | 5 | 6 | 44.5 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 13 | 11 | 9 | 10 | 5 | 6.5 | 5 | 7.5 | 48.3 | 33.0 | 33.0 | 5 | 16 | 93.0 | 5 | 16 | 28.0 | 4 | 6 | 6 | 7 | 77.0 | 139 | 151 | 5 | 6 | 44.5 | 5 | 12 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 9 | 10 | 9 | 10 | 5 | 8.5 | 5 | 6 | 48.3 | 29.0 | 29.0 | 5 | 15 | 93.0 | 5 | 15 | 29.0 | 5 | 8 | 6 | 6 | 71.4 | 138 | 150 | 6 | 7 | 46.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 9 | 11 | 9 | 10 | 5 | 8.5 | 6 | 7 | 69.3 | 29.0 | 33.0 | 5 | 15 | 47.0 | 5 | 15 | 28.0 | 5 | 8.5 | 6 | 6 | 68.0 | 139 | 151 | 5 | 6 | 43.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 9 | 11 | 9 | 10 | 5 | 8.5 | 6 | 6.5 | 61.6 | 29.0 | 33.0 | 5 | 13 | 44.0 | 5 | 13 | 27.5 | 5 | 7.5 | 6 | 6 | 63.8 | 139 | 151 | 6 | 7 | 45.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 10 | 11 | 10 | 10 | 5 | 8 | 5 | 6 | 56.4 | 30.0 | 30.0 | 5 | 13 | 43.0 | 5 | 13 | 27.5 | 5 | 7 | 6 | 6 | 60.1 | 139 | 151 | 6 | 6.5 | 45.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 11 | 12 | 10 | 10 | 5 | 7.5 | 5 | 6 | 55.0 | 31.0 | 31.0 | 5 | 13 | 42.5 | 5 | 13 | 27.0 | 5 | 6.5 | 6 | 6.5 | 59.1 | 140 | 152 | 6 | 6.5 | 45.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 11 | 13 | 10 | 10 | 5 | 7.5 | 6 | 7 | 55.6 | 31.0 | 35.0 | 6 | 16 | 45.0 | 6 | 16 | 30.0 | 5 | 6.5 | 6 | 6.5 | 58.5 | 141 | 153 | 6 | 6.5 | 45.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 12 | 14 | 11 | 10 | 5 | 7 | 6 | 8.5 | 54.6 | 32.0 | 36.0 | 6 | 16 | 44.5 | 6 | 16 | 30.0 | 5 | 6.5 | 6 | 7 | 57.4 | 142 | 154 | 6 | 6.5 | 45.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 13 | 15 | 11 | 10 | 5 | 6.5 | 6 | 7.5 | 54.6 | 33.0 | 37.0 | 6 | 16 | 44.0 | 6 | 16 | 30.0 | 5 | 6.5 | 6 | 6.5 | 57.1 | 143 | 155 | 6 | 7 | 44.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 13 | 15 | 11 | 10 | 5 | 6.5 | 6 | 7.5 | 51.5 | 33.0 | 37.0 | 6 | 15 | 43.5 | 6 | 15 | 29.5 | 5 | 6 | 6 | 6.5 | 53.4 | 143 | 155 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 14 | 16 | 12 | 10 | 5 | 6 | 6 | 8 | 51.9 | 34.0 | 38.0 | 6 | 16 | 43.0 | 6 | 16 | 29.5 | 5 | 6 | 6 | 7.5 | 53.6 | 144 | 156 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 15 | 17 | 12 | 10 | 5 | 6 | 6 | 7.5 | 58.0 | 35.0 | 39.0 | 6 | 16 | 48.5 | 6 | 16 | 35.5 | 5 | 6 | 6 | 7.5 | 53.8 | 145 | 157 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 16 | 18 | 13 | 10 | 6 | 8.5 | 6 | 7.5 | 58.5 | 36.0 | 40.0 | 6 | 15 | 48.0 | 6 | 15 | 34.5 | 5 | 6 | 6 | 8 | 54.0 | 146 | 158 | 6 | 6.5 | 44.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 17 | 19 | 13 | 10 | 6 | 8 | 6 | 7 | 58.6 | 37.0 | 41.0 | 6 | 14 | 47.5 | 6 | 14 | 33.5 | 6 | 8.5 | 6 | 8 | 54.1 | 147 | 159 | 6 | 6 | 44.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 17 | 20 | 13 | 10 | 6 | 7.5 | 6 | 6.5 | 58.5 | 37.0 | 41.0 | 6 | 14 | 47.5 | 6 | 14 | 34.5 | 6 | 8 | 6 | 7 | 54.4 | 148 | 160 | 6 | 6 | 44.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 18 | 21 | 14 | 10 | 6 | 7.5 | 6 | 7 | 59.1 | 38.0 | 42.0 | 6 | 13 | 47.0 | 6 | 13 | 33.5 | 6 | 8 | 6 | 8 | 54.6 | 149 | 161 | 7 | 7.5 | 47.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 19 | 22 | 14 | 10 | 6 | 7.5 | 6 | 6.5 | 59.3 | 39.0 | 43.0 | 6 | 13 | 46.5 | 6 | 13 | 32.5 | 6 | 8 | 6 | 8 | 54.9 | 150 | 162 | 7 | 7.5 | 47.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 19 | 22 | 15 | 10 | 6 | 7 | 6 | 6.5 | 59.5 | 43.0 | 43.0 | 6 | 13 | 46.0 | 6 | 13 | 33.0 | 6 | 7 | 6 | 8 | 54.9 | 150 | 162 | 7 | 7.5 | 48.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 20 | 23 | 15 | 10 | 6 | 7 | 6 | 6.5 | 59.6 | 44.0 | 44.0 | 6 | 12 | 45.5 | 6 | 12 | 32.0 | 6 | 7.5 | 6 | 8 | 55.1 | 151 | 163 | 7 | 7 | 47.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 20 | 24 | 16 | 10 | 6 | 6 | 6 | 6.5 | 60.0 | 44.0 | 44.0 | 6 | 12 | 45.0 | 6 | 12 | 32.5 | 6 | 7.5 | 6 | 7.5 | 55.5 | 152 | 164 | 7 | 7 | 48.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 21 | 25 | 16 | 10 | 6 | 6.5 | 6 | 6 | 60.3 | 45.0 | 45.0 | 6 | 12 | 44.5 | 6 | 12 | 31.5 | 6 | 7.5 | 6 | 7.5 | 55.8 | 153 | 165 | 7 | 7 | 48.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 22 | 25 | 17 | 10 | 6 | 6.5 | 6 | 6.5 | 60.8 | 46.0 | 46.0 | 6 | 12 | 44.0 | 6 | 12 | 31.0 | 6 | 6.5 | 6 | 7 | 55.9 | 153 | 165 | 7 | 6.5 | 48.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 22 | 26 | 17 | 10 | 6 | 6 | 6 | 6 | 60.8 | 46.0 | 46.0 | 6 | 12 | 44.0 | 6 | 12 | 31.0 | 6 | 7 | 6 | 7 | 56.1 | 154 | 166 | 7 | 6.5 | 48.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 23 | 27 | 18 | 10 | 6 | 6 | 6 | 6.5 | 61.5 | 47.0 | 47.0 | 6 | 12 | 43.5 | 6 | 12 | 31.0 | 6 | 7 | 6 | 6.5 | 56.6 | 155 | 167 | 7 | 6.5 | 48.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 23 | 28 | 19 | 10 | 6 | 6 | 6 | 6.5 | 62.0 | 43.0 | 47.0 | 6 | 12 | 43.5 | 6 | 12 | 31.0 | 6 | 7 | 6 | 7 | 57.0 | 156 | 168 | 7 | 6.5 | 48.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE DOUBLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 9 FEET
HEIGHT (HT): 11 THRU 12 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
13 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|---------|------|------|------------------|------|---------|------|------|------|---------|-------|-------|---------|------|------------------------------------|-----------|------|------|------|------|----|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 10 | 8 | 8 | 5 | 6.5 | 4 | 7 | 48.9 | 29.0 | 29.0 | 29.0 | 5 | 15 | 98.0 | 5 | 15 | 29.0 | 4 | 6 | 4 | 7 | 48.1 | 66 | 78 | 90 | 5 | 6 | 47.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | |
| 2 FT | 13 | 10 | 8 | 8 | 5 | 6.5 | 4 | 7 | 48.9 | 29.0 | 29.0 | 29.0 | 5 | 13 | 98.0 | 5 | 13 | 28.5 | 5 | 8.5 | 4 | 6.5 | 43.8 | 66 | 78 | 90 | 6 | 7 | 50.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | |
| 4 FT | 9 | 10 | 8 | 8 | 5 | 7.5 | 6 | 7.5 | 43.1 | 25.0 | 25.0 | 25.0 | 5 | 12 | 62.0 | 5 | 12 | 30.0 | 5 | 8 | 4 | 7 | 38.9 | 66 | 78 | 90 | 6 | 6.5 | 49.5 | 5 | 8.5 | 5 | 12 | 12 | | | | | | | | |
| 6 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 5 | 6 | 38.0 | 25.0 | 25.0 | 25.0 | 6 | 15 | 53.5 | 6 | 15 | 32.0 | 5 | 7 | 4 | 6.5 | 36.1 | 66 | 78 | 90 | 6 | 6 | 48.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | |
| 8 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 7.5 | 36.0 | 26.0 | 26.0 | 26.0 | 6 | 16 | 51.0 | 6 | 16 | 31.5 | 5 | 7 | 4 | 6.5 | 34.1 | 67 | 79 | 91 | 6 | 6 | 48.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 10 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 8 | 34.1 | 27.0 | 27.0 | 27.0 | 6 | 15 | 49.5 | 6 | 15 | 31.0 | 5 | 6.5 | 4 | 6 | 32.6 | 68 | 80 | 92 | 6 | 6.5 | 48.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 12 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 8.5 | 32.8 | 28.0 | 28.0 | 28.0 | 6 | 15 | 48.5 | 6 | 15 | 31.0 | 5 | 6.5 | 4 | 6 | 31.5 | 69 | 81 | 93 | 6 | 6.5 | 48.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 14 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 31.6 | 29.0 | 29.0 | 33.0 | 6 | 15 | 48.5 | 6 | 15 | 31.0 | 5 | 6 | 5 | 9 | 30.8 | 70 | 82 | 94 | 6 | 6 | 47.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 16 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8.5 | 30.8 | 30.0 | 30.0 | 34.0 | 6 | 14 | 48.0 | 6 | 14 | 31.0 | 5 | 6 | 5 | 8.5 | 30.1 | 71 | 83 | 95 | 6 | 6 | 47.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 18 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 8 | 35.1 | 31.0 | 31.0 | 35.0 | 6 | 14 | 53.5 | 6 | 14 | 36.5 | 6 | 8 | 5 | 8 | 29.9 | 72 | 84 | 96 | 6 | 6 | 47.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 20 FT | 15 | 17 | 8 | 8 | 6 | 7.5 | 5 | 8 | 35.1 | 31.0 | 31.0 | 35.0 | 6 | 13 | 53.5 | 6 | 13 | 36.5 | 6 | 8 | 5 | 7 | 29.4 | 73 | 85 | 97 | 6 | 6 | 47.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 22 FT | 16 | 18 | 8 | 8 | 6 | 8 | 5 | 7 | 33.4 | 32.0 | 36.0 | 36.0 | 6 | 13 | 52.5 | 6 | 13 | 36.5 | 6 | 8 | 5 | 6.5 | 28.0 | 74 | 86 | 98 | 6 | 6.5 | 47.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 24 FT | 17 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 33.3 | 37.0 | 37.0 | 37.0 | 6 | 13 | 52.5 | 6 | 13 | 36.5 | 6 | 8 | 5 | 6.5 | 28.0 | 75 | 87 | 99 | 6 | 6 | 47.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | |
| 26 FT | 18 | 20 | 8 | 8 | 6 | 7 | 5 | 6.5 | 33.1 | 38.0 | 38.0 | 38.0 | 6 | 13 | 52.0 | 6 | 13 | 36.5 | 6 | 8 | 5 | 6 | 28.1 | 76 | 88 | 100 | 6 | 6 | 47.5 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | |
| 28 FT | 19 | 21 | 8 | 8 | 6 | 7 | 5 | 6 | 33.1 | 39.0 | 39.0 | 39.0 | 6 | 13 | 52.0 | 6 | 13 | 36.0 | 6 | 7.5 | 6 | 7.5 | 31.3 | 77 | 89 | 101 | 7 | 7.5 | 50.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | |
| 30 FT | 20 | 22 | 8 | 8 | 6 | 7 | 6 | 7.5 | 37.1 | 44.0 | 44.0 | 44.0 | 6 | 12 | 51.5 | 6 | 12 | 35.5 | 6 | 7.5 | 6 | 7 | 31.4 | 78 | 90 | 102 | 7 | 7.5 | 50.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | |
| 32 FT | 21 | 23 | 8 | 8 | 6 | 6.5 | 6 | 7 | 37.1 | 45.0 | 45.0 | 45.0 | 6 | 12 | 51.0 | 6 | 12 | 34.5 | 6 | 7.5 | 6 | 6.5 | 31.5 | 79 | 91 | 103 | 7 | 7 | 50.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | |
| 34 FT | 22 | 23 | 8 | 8 | 6 | 6.5 | 6 | 6.5 | 37.0 | 46.0 | 46.0 | 46.0 | 7 | 15 | 55.5 | 7 | 15 | 38.5 | 6 | 6.5 | 6 | 6.5 | 31.6 | 79 | 91 | 103 | 7 | 7 | 50.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | |
| 36 FT | 22 | 24 | 8 | 8 | 6 | 6 | 6 | 6.5 | 37.1 | 46.0 | 46.0 | 46.0 | 7 | 15 | 55.5 | 7 | 15 | 39.5 | 6 | 7 | 6 | 6 | 31.6 | 80 | 92 | 104 | 7 | 7 | 50.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | |
| 38 FT | 23 | 25 | 8 | 8 | 6 | 6 | 6 | 6 | 37.1 | 47.0 | 47.0 | 47.0 | 7 | 15 | 55.0 | 7 | 15 | 38.5 | 6 | 7 | 6 | 6 | 31.9 | 81 | 93 | 105 | 7 | 6.5 | 50.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | |
| 40 FT | 24 | 26 | 9 | 8 | 6 | 6 | 6 | 7 | 38.0 | 48.0 | 48.0 | 48.0 | 7 | 14 | 54.0 | 7 | 14 | 37.5 | 6 | 7 | 6 | 6.5 | 32.5 | 82 | 94 | 106 | 7 | 6.5 | 50.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | |
| 42 FT | 25 | 27 | 9 | 8 | 6 | 6 | 6 | 6.5 | 38.0 | 49.0 | 49.0 | 49.0 | 7 | 14 | 53.5 | 7 | 14 | 37.0 | 6 | 7 | 6 | 6.5 | 32.6 | 83 | 95 | 107 | 7 | 6 | 50.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | |
| 44 FT | 25 | 28 | 9 | 8 | 7 | 7.5 | 6 | 6.5 | 38.1 | 49.0 | 49.0 | 49.0 | 7 | 14 | 53.0 | 7 | 14 | 37.5 | 6 | 6.5 | 6 | 6 | 32.8 | 84 | 96 | 108 | 7 | 6 | 50.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | |
| 46 FT | 26 | 28 | 9 | 8 | 7 | 7.5 | 6 | 6.5 | 38.1 | 50.0 | 50.0 | 50.0 | 7 | 13 | 52.5 | 7 | 13 | 36.5 | 6 | 6.5 | 6 | 6 | 32.9 | 84 | 96 | 108 | 7 | 6 | 50.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | |
| 48 FT | 27 | 29 | 9 | 8 | 7 | 7.5 | 6 | 6 | 38.1 | 51.0 | 51.0 | 51.0 | 7 | 14 | 51.5 | 7 | 14 | 36.5 | 6 | 6.5 | 6 | 6 | 33.0 | 85 | 97 | 109 | 7 | 6 | 50.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | |
| 50 FT | 27 | 30 | 10 | 8 | 7 | 7 | 6 | 7 | 39.0 | 51.0 | 51.0 | 51.0 | 7 | 13 | 51.5 | 7 | 13 | 36.0 | 6 | 6.5 | 6 | 6.5 | 33.5 | 86 | 98 | 110 | 7 | 6 | 50.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | |

| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|--------|------|---------|-------|------|------------------|------|---------|------|------|------|---------|-------|-------|---------|------|---------|-----------|------|------|-------------------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 10 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 50.9 | 29.0 | 33.0 | 33.0 | 5 | 14 | 100.0 | 5 | 14 | 29.5 | 5 | 8.5 | 6 | 7.5 | 71.6 | 102 | 114 | 126 | 5 | 6 | 47.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 13 | 11 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 50.9 | 29.0 | 33.0 | 33.0 | 5 | 13 | 100.0 | 5 | 13 | 28.5 | 5 | 8.5 | 5 | 6 | 64.1 | 103 | 115 | 127 | 5 | 6 | 47.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 9 | 10 | 9 | 8 | 5 | 7.5 | 5 | 6 | 69.0 | 25.0 | 25.0 | 29.0 | 5 | 12 | 73.0 | 5 | 12 | 30.0 | 5 | 7.5 | 5 | 6 | 55.4 | 102 | 114 | 126 | 6 | 6.5 | 49.5 | 5 | 10 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 9 | 10 | 9 | 8 | 5 | 8.5 | 5 | 6 | 51.4 | 25.0 | 29.0 | 29.0 | 6 | 15 | 54.0 | 6 | 15 | 32.0 | 5 | 7 | 6 | 7 | 53.4 | 102 | 114 | 126 | 6 | 6 | 48.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 10 | 11 | 9 | 8 | 5 | 8 | 5 | 6 | 48.0 | 26.0 | 30.0 | 30.0 | 5 | 12 | 48.0 | 5 | 12 | 28.5 | 5 | 7 | 6 | 7.5 | 50.9 | 103 | 115 | 127 | 6 | 6 | 48.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 11 | 12 | 9 | 8 | 5 | 7.5 | 5 | 6 | 46.0 | 31.0 | 31.0 | 31.0 | 6 | 16 | 49.5 | 6 | 16 | 31.0 | 5 | 6.5 | 5 | 6 | 46.3 | 104 | 116 | 128 | 6 | 6 | 48.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 12 | 13 | 9 | 8 | 5 | 7 | 5 | 6 | 44.5 | 32.0 | 32.0 | 32.0 | 6 | 15 | 48.5 | 6 | 15 | 31.0 | 5 | 6.5 | 5 | 6 | 45.0 | 105 | 117 | 129 | 6 | 6 | 47.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 13 | 14 | 9 | 8 | 5 | 6.5 | 5 | 6 | 43.3 | 33.0 | 33.0 | 33.0 | 6 | 15 | 48.0 | 6 | 15 | 30.5 | 5 | 6 | 5 | 6 | 43.9 | 106 | 118 | 130 | 6 | 6 | 47.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 14 | 15 | 9 | 8 | 5 | 6 | 5 | 6 | 42.1 | 34.0 | 34.0 | 34.0 | 6 | 15 | 47.5 | 6 | 15 | 30.5 | 5 | 6 | 5 | 6 | 43.0 | 107 | 119 | 131 | 6 | 6 | 47.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 15 | 16 | 10 | 8 | 6 | 8.5 | 5 | 6.5 | 47.1 | 35.0 | 35.0 | 35.0 | 6 | 15 | 53.0 | 6 | 15 | 36.5 | 6 | 8 | 5 | 7 | 42.8 | 108 | 120 | 132 | 6 | 6 | 47.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 15 | 17 | 10 | 8 | 6 | 8 | 6 | 8 | 50.6 | 35.0 | 35.0 | 35.0 | 6 | 13 | 52.5 | 6 | 13 | 36.5 | 6 | 8 | 5 | 6.5 | 42.3 | 109 | 121 | 133 | 6 | 6 | 47.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 16 | 18 | 10 | 8 | 6 | 8 | 5 | 6 | 44.5 | 36.0 | 36.0 | 36.0 | 6 | 14 | 52.0 | 6 | 14 | 36.0 | 6 | 8 | 5 | 7 | 40.0 | 110 | 122 | 134 | 6 | 6.5 | 47.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 17 | 19 | 10 | 8 | 6 | 7.5 | 6 | 8 | 48.4 | 37.0 | 37.0 | 37.0 | 6 | 14 | 51.5 | 6 | 14 | 36.0 | 6 | 8 | 5 | 6.5 | 40.1 | 111 | 123 | 135 | 6 | 6 | 47.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 18 | 20 | 11 | 8 | 6 | 7.5 | 5 | 6 | 45.0 | 38.0 | 38.0 | 38.0 | 6 | 13 | 51.0 | 6 | 13 | 35.5 | 6 | 7.5 | 5 | 7 | 40.5 | 112 | 124 | 136 | 6 | 6 | 47.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 19 | 21 | 11 | 8 | 6 | 7 | 6 | 8 | 49.0 | 39.0 | 39.0 | 39.0 | 6 | 13 | 50.5 | 6 | 13 | 35.0 | 6 | 7.5 | 5 | 7 | 40.5 | 113 | 125 | 137 | 7 | 7.5 | 50.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 19 | 22 | 12 | 8 | 6 | 6.5 | 6 | 8 | 49.8 | 39.0 | 39.0 | 39.0 | 6 | 13 | 50.0 | 6 | 13 | 35.5 | 6 | 7.5 | 5 | 6.5 | 40.9 | 114 | 126 | 138 | 7 | 7.5 | 50.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 20 | 23 | 12 | 8 | 6 | 6.5 | 6 | 8 | 49.6 | 40.0 | 40.0 | 40.0 | 6 | 12 | 49.5 | 6 | 12 | 34.5 | 6 | 7.5 | 5 | 6.5 | 41.0 | 115 | 127 | 139 | 7 | 7 | 50.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 21 | 24 | 12 | 8 | 6 | 6.5 | 6 | 7.5 | 49.6 | 41.0 | 41.0 | 41.0 | 6 | 12 | 49.0 | 6 | 12 | 33.5 | 6 | 7.5 | 5 | 6.5 | 41.1 | 116 | 128 | 140 | 7 | 7 | 50.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 22 | 25 | 12 | 8 | 6 | 6.5 | 6 | 6.5 | 49.6 | 42.0 | 42.0 | 42.0 | 7 | 15 | 53.0 | 7 | 15 | 38.0 | 6 | 7 | 5 | 6.5 | 41.3 | 117 | 129 | 141 | 7 | 6.5 | 50.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 23 | 26 | 13 | 8 | 6 | 6 | 6 | 7.5 | 50.4 | 43.0 | 43.0 | 43.0 | 7 | 15 | 52.0 | 7 | 15 | 37.0 | 6 | 7 | 5 | 6 | 41.8 | 118 | 130 | 142 | 7 | 6.5 | 50.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 23 | 26 | 13 | 8 | 6 | 6 | 6 | 7 | 50.3 | 43.0 | 43.0 | 43.0 | 7 | 15 | 52.0 | 7 | 15 | 37.5 | 6 | 6.5 | 5 | 6 | 41.6 | 118 | 130 | 142 | 7 | 6.5 | 50.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 24 | 27 | 14 | 8 | 6 | 6 | 6 | 7.5 | 51.0 | 44.0 | 44.0 | 44.0 | 7 | 14 | 51.5 | 7 | 14 | 36.5 | 6 | 6.5 | 5 | 6 | 42.1 | 119 | 131 | 143 | 7 | 6 | 50.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 24 | 28 | 14 | 8 | 7 | 7 | 6 | 7 | 51.1 | 44.0 | 44.0 | 44.0 | 7 | 14 | 51.5 | 7 | 14 | 37.0 | 6 | 6.5 | 5 | 6 | 42.1 | 120 | 132 | 144 | 7 | 6 | 50.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 25 | 29 | 14 | 8 | 7 | 7.5 | 6 | 6.5 | 51.1 | 45.0 | 49.0 | 49.0 | 7 | 14 | 51.0 | 7 | 14 | 36.0 | 6 | 6.5 | 6 | 8.5 | 45.4 | 121 | 133 | 145 | 7 | 6 | 50.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 26 | 30 | 14 | 8 | 7 | 7 | 6 | 6 | 51.1 | 46.0 | 50.0 | 50.0 | 7 | 15 | 50.5 | 7 | 15 | 36.0 | 6 | 6.5 | 6 | 8 | 45.6 | 122 | 134 | 146 | 7 | 6 | 50.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 26 | 30 | 15 | 8 | 7 | 7 | 6 | 6.5 | 51.9 | 50.0 | 50.0 | 50.0 | 7 | 14 | 50.5 | 7 | 14 | 36.0 | 6 | 6 | 6 | 8 | 45.8 | 122 | 134 | 146 | 8 | 7.5 | 56.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |

| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|-------|---------|------|------|------------------|------|---------|------|------|--------|---------|--------|------|---------|-----------|---------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 10 | 9 | 10 | 5 | 6.5 | 5 | 6.5 | 51.9 | 33.0 | 33.0 | 33.0 | 5 | 14 | 101.0 | 5 | 14 | 30.0 | 5 | 7.5 | 6 | 6 | 85.4 | 138 | 150 | 162 | 6 | 7 | 51.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | |
| 2 FT | 13 | 11 | 9 | 10 | 5 | 6.5 | 5 | 6 | 51.9 | 33.0 | 33.0 | 33.0 | 5 | 13 | 101.0 | 5 | 13 | 29.0 | 5 | 8 | 6 | 6 | 82.6 | 139 | 151 | 163 | 5 | 6 | 47.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | |
| 4 FT | 9 | 10 | 10 | 10 | 5 | 7.5 | 6 | 7 | 52.5 | 29.0 | 29.0 | 33.0 | 5 | 12 | 101.5 | 5 | 12 | 30.5 | 5 | 7 | 6 | 6 | 74.5 | 138 | 150 | 162 | 6 | 6 | 50.0 | 5 | 10 | 5 | 8 | 12 | | | | | | | | | | | | | |
| 6 FT | 9 | 11 | 10 | 10 | 5 | 8.5 | 6 | 7 | 70.4 | 29.0 | 29.0 | 33.0 | 5 | 12 | 50.5 | 5 | 12 | 29.5 | 5 | 7 | 6 | 6 | 71.0 | 139 | 151 | 163 | 6 | 6.5 | 49.5 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | |
| 8 FT | 10 | 12 | 11 | 10 | 5 | 8 | 5 | 6 | 62.6 | 30.0 | 30.0 | 30.0 | 5 | 12 | 47.5 | 5 | 12 | 29.0 | 5 | 7 | 5 | 6 | 64.6 | 140 | 152 | 164 | 6 | 6.5 | 48.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 10 FT | 11 | 12 | 11 | 10 | 5 | 7.5 | 5 | 6.5 | 60.9 | 31.0 | 31.0 | 31.0 | 5 | 12 | 46.5 | 5 | 12 | 28.5 | 5 | 6.5 | 6 | 6.5 | 64.4 | 140 | 152 | 164 | 6 | 6 | 48.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 12 FT | 11 | 13 | 11 | 10 | 5 | 7.5 | 6 | 7.5 | 60.6 | 31.0 | 31.0 | 35.0 | 6 | 15 | 48.5 | 6 | 15 | 31.5 | 5 | 6 | 6 | 6.5 | 63.6 | 141 | 153 | 165 | 6 | 6 | 48.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 14 FT | 12 | 14 | 11 | 10 | 5 | 7 | 6 | 7.5 | 59.6 | 32.0 | 32.0 | 36.0 | 6 | 14 | 48.0 | 6 | 14 | 31.5 | 5 | 6 | 6 | 6.5 | 62.5 | 142 | 154 | 166 | 6 | 6 | 48.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 16 FT | 13 | 15 | 12 | 10 | 5 | 6.5 | 6 | 7.5 | 58.4 | 33.0 | 33.0 | 37.0 | 6 | 14 | 47.5 | 6 | 14 | 31.0 | 6 | 8 | 6 | 7 | 61.1 | 143 | 155 | 167 | 6 | 6 | 48.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 18 FT | 14 | 16 | 12 | 10 | 5 | 6 | 6 | 7 | 58.0 | 34.0 | 38.0 | 38.0 | 6 | 14 | 47.0 | 6 | 14 | 31.0 | 6 | 8 | 6 | 6.5 | 60.5 | 144 | 156 | 168 | 6 | 6.5 | 48.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 20 FT | 15 | 17 | 13 | 10 | 6 | 8 | 6 | 7 | 64.0 | 35.0 | 39.0 | 39.0 | 6 | 14 | 52.5 | 6 | 14 | 37.0 | 6 | 8 | 6 | 6.5 | 59.9 | 145 | 157 | 169 | 6 | 6.5 | 48.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 22 FT | 15 | 18 | 13 | 10 | 6 | 7.5 | 6 | 7 | 61.1 | 35.0 | 35.0 | 39.0 | 6 | 13 | 52.0 | 6 | 13 | 37.0 | 6 | 8 | 6 | 7.5 | 57.4 | 146 | 158 | 170 | 6 | 6.5 | 48.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 24 FT | 16 | 19 | 13 | 10 | 6 | 7.5 | 6 | 6.5 | 61.3 | 36.0 | 36.0 | 40.0 | 6 | 13 | 51.5 | 6 | 13 | 36.5 | 6 | 7.5 | 6 | 7.5 | 57.4 | 147 | 159 | 171 | 6 | 6 | 48.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 26 FT | 17 | 20 | 14 | 10 | 6 | 7.5 | 6 | 7 | 61.8 | 37.0 | 37.0 | 41.0 | 6 | 13 | 51.5 | 6 | 13 | 36.5 | 6 | 7.5 | 6 | 7.5 | 57.6 | 148 | 160 | 172 | 6 | 6 | 48.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 28 FT | 18 | 21 | 14 | 10 | 6 | 7 | 6 | 6.5 | 61.9 | 38.0 | 38.0 | 42.0 | 6 | 13 | 51.0 | 6 | 13 | 36.5 | 6 | 7.5 | 6 | 7.5 | 57.8 | 149 | 161 | 173 | 7 | 7.5 | 51.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 30 FT | 19 | 22 | 15 | 10 | 6 | 7 | 6 | 6.5 | 62.4 | 39.0 | 43.0 | 43.0 | 6 | 13 | 50.0 | 6 | 13 | 35.5 | 6 | 7.5 | 6 | 7.5 | 58.0 | 150 | 162 | 174 | 7 | 7.5 | 51.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 32 FT | 20 | 23 | 15 | 10 | 6 | 7 | 6 | 6 | 62.5 | 44.0 | 44.0 | 44.0 | 6 | 12 | 49.5 | 6 | 12 | 34.5 | 6 | 7 | 6 | 7.5 | 58.1 | 151 | 163 | 175 | 7 | 7 | 51.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 34 FT | 21 | 24 | 16 | 10 | 6 | 6.5 | 6 | 6.5 | 63.0 | 41.0 | 45.0 | 45.0 | 6 | 12 | 48.5 | 6 | 12 | 33.5 | 6 | 7 | 6 | 7.5 | 58.5 | 152 | 164 | 176 | 7 | 7 | 51.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 36 FT | 21 | 25 | 16 | 10 | 6 | 6 | 6 | 6 | 62.9 | 45.0 | 45.0 | 45.0 | 6 | 12 | 48.5 | 6 | 12 | 34.0 | 6 | 7 | 6 | 7.5 | 58.6 | 153 | 165 | 177 | 7 | 6.5 | 51.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 38 FT | 22 | 26 | 17 | 10 | 6 | 6.5 | 6 | 6 | 63.5 | 42.0 | 46.0 | 46.0 | 7 | 15 | 52.5 | 7 | 15 | 38.5 | 6 | 7 | 6 | 7 | 59.0 | 154 | 166 | 178 | 7 | 6.5 | 51.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | |
| 40 FT | 23 | 26 | 17 | 10 | 6 | 6 | 6 | 6 | 63.5 | 47.0 | 47.0 | 47.0 | 7 | 15 | 52.0 | 7 | 15 | 37.5 | 6 | 6 | 6 | 7 | 58.9 | 154 | 166 | 178 | 7 | 6.5 | 51.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | |
| 42 FT | 24 | 27 | 18 | 10 | 6 | 6 | 6 | 6 | 64.1 | 44.0 | 48.0 | 48.0 | 7 | 15 | 51.5 | 7 | 15 | 37.0 | 6 | 6.5 | 6 | 6.5 | 59.3 | 155 | 167 | 179 | 7 | 6 | 51.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | |
| 44 FT | 24 | 28 | 19 | 10 | 7 | 8 | 6 | 6 | 64.6 | 44.0 | 48.0 | 48.0 | 7 | 14 | 51.5 | 7 | 14 | 37.0 | 6 | 6.5 | 6 | 6.5 | 59.6 | 156 | 168 | 180 | 7 | 6 | 51.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | |
| 46 FT | 25 | 29 | 19 | 10 | 7 | 7.5 | 6 | 6 | 64.8 | 49.0 | 49.0 | 49.0 | 7 | 15 | 51.0 | 7 | 15 | 36.5 | 6 | 6.5 | 6 | 6.5 | 59.9 | 157 | 169 | 181 | 7 | 6 | 51.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | |
| 48 FT | 25 | 30 | 20 | 10 | 7 | 7.5 | 7 | 8 | 70.3 | 49.0 | 49.0 | 49.0 | 7 | 15 | 51.0 | 7 | 15 | 36.5 | 6 | 6.5 | 6 | 6.5 | 60.3 | 158 | 170 | 182 | 7 | 6 | 51.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | |
| 50 FT | 26 | 31 | 20 | 10 | 7 | 7 | 7 | 7 | 70.4 | 50.0 | 50.0 | 50.0 | 7 | 15 | 50.5 | 7 | 15 | 36.5 | 6 | 6 | 6 | 6 | 60.5 | 159 | 171 | 183 | 7 | 6 | 51.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

CONCRETE
DOUBLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 10 FEET
HEIGHT (HT): 11 THRU 13 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
15 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|---------|------|---------|------|------------------|------|------|------|---------|------|---------|-------|---------|-------|------|------------------------------------|-----------|------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | |
| | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 8 | 8 | 5 | 6 | 4 | 6.5 | 52.5 | 30.0 | 30.0 | 30.0 | 5 | 13 | 106.5 | 5 | 13 | 30.0 | 5 | 8 | 5 | 7 | 52.9 | 78 | 90 | 102 | 6 | 7 | 53.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 2 FT | 14 | 11 | 8 | 8 | 5 | 6 | 4 | 6 | 52.5 | 30.0 | 30.0 | 30.0 | 5 | 12 | 106.5 | 5 | 12 | 29.0 | 5 | 8 | 5 | 8 | 49.1 | 79 | 91 | 103 | 6 | 7 | 53.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 4 FT | 10 | 10 | 8 | 8 | 5 | 7 | 5 | 6 | 45.6 | 26.0 | 26.0 | 30.0 | 6 | 16 | 72.5 | 5 | 16 | 35.0 | 5 | 7 | 5 | 6.5 | 43.0 | 78 | 90 | 102 | 6 | 6 | 52.5 | 5 | 10.5 | 5 | 12 | 12 | | | | | | | | | | | |
| 6 FT | 10 | 11 | 8 | 8 | 5 | 7.5 | 5 | 6 | 40.8 | 26.0 | 26.0 | 30.0 | 6 | 15 | 58.5 | 6 | 15 | 33.5 | 5 | 6.5 | 5 | 7.5 | 39.5 | 79 | 91 | 103 | 6 | 6 | 52.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 8 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 7 | 38.6 | 27.0 | 27.0 | 31.0 | 6 | 15 | 54.5 | 6 | 15 | 33.0 | 5 | 6.5 | 5 | 8 | 37.3 | 80 | 92 | 104 | 6 | 6 | 51.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 10 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 7.5 | 36.6 | 28.0 | 28.0 | 32.0 | 6 | 14 | 53.0 | 6 | 14 | 32.5 | 5 | 6 | 5 | 8 | 35.6 | 81 | 93 | 105 | 6 | 6 | 51.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 12 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 7.5 | 35.3 | 29.0 | 33.0 | 33.0 | 6 | 14 | 52.0 | 6 | 14 | 32.5 | 6 | 8.5 | 5 | 8.5 | 34.6 | 82 | 94 | 106 | 6 | 6 | 51.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 14 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8 | 34.1 | 30.0 | 34.0 | 34.0 | 6 | 13 | 51.5 | 6 | 13 | 32.0 | 6 | 8 | 5 | 8.5 | 33.8 | 83 | 95 | 107 | 6 | 6 | 51.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 16 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 7.5 | 38.3 | 31.0 | 35.0 | 35.0 | 6 | 13 | 57.0 | 6 | 13 | 38.0 | 6 | 7.5 | 5 | 8 | 33.1 | 84 | 96 | 108 | 6 | 6 | 51.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 18 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 7 | 37.5 | 32.0 | 36.0 | 36.0 | 6 | 12 | 56.5 | 6 | 12 | 38.0 | 6 | 7 | 5 | 7 | 32.6 | 85 | 97 | 109 | 7 | 7 | 53.5 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | |
| 20 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 37.1 | 37.0 | 37.0 | 37.0 | 6 | 12 | 56.5 | 6 | 12 | 38.0 | 6 | 7 | 5 | 6.5 | 32.4 | 86 | 98 | 110 | 7 | 7 | 53.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 22 FT | 18 | 20 | 8 | 8 | 6 | 7 | 5 | 6.5 | 37.1 | 38.0 | 38.0 | 38.0 | 6 | 12 | 56.0 | 6 | 12 | 37.5 | 6 | 7.5 | 5 | 6 | 32.4 | 88 | 100 | 112 | 6 | 6 | 50.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 24 FT | 19 | 20 | 8 | 8 | 6 | 6.5 | 5 | 6 | 35.1 | 39.0 | 39.0 | 39.0 | 6 | 12 | 55.0 | 6 | 12 | 37.5 | 6 | 7 | 5 | 6 | 30.9 | 88 | 100 | 112 | 6 | 6 | 50.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 26 FT | 20 | 21 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 39.1 | 44.0 | 44.0 | 44.0 | 6 | 12 | 54.5 | 6 | 12 | 37.5 | 6 | 6.5 | 6 | 7.5 | 33.9 | 89 | 101 | 113 | 7 | 7 | 53.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 28 FT | 21 | 22 | 8 | 8 | 6 | 6.5 | 6 | 7 | 39.1 | 45.0 | 45.0 | 45.0 | 6 | 12 | 54.5 | 6 | 12 | 37.0 | 6 | 6 | 6 | 7 | 34.0 | 90 | 102 | 114 | 7 | 7 | 53.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 30 FT | 22 | 23 | 8 | 8 | 6 | 6 | 6 | 6.5 | 39.1 | 46.0 | 46.0 | 46.0 | 7 | 15 | 59.0 | 7 | 15 | 41.0 | 6 | 6 | 6 | 6.5 | 34.1 | 91 | 103 | 115 | 7 | 7 | 53.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | |
| 32 FT | 23 | 24 | 8 | 8 | 6 | 6 | 6 | 6 | 39.1 | 47.0 | 47.0 | 47.0 | 7 | 15 | 58.5 | 7 | 15 | 40.5 | 6 | 6 | 6 | 6 | 34.3 | 92 | 104 | 116 | 7 | 7 | 53.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 34 FT | 23 | 26 | 9 | 8 | 7 | 7.5 | 6 | 7 | 40.3 | 47.0 | 47.0 | 47.0 | 7 | 15 | 58.0 | 7 | 15 | 41.0 | 6 | 6.5 | 6 | 6.5 | 34.8 | 94 | 106 | 118 | 7 | 6.5 | 53.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | |
| 36 FT | 24 | 27 | 9 | 8 | 7 | 7.5 | 6 | 7 | 40.3 | 48.0 | 48.0 | 48.0 | 7 | 14 | 57.5 | 7 | 14 | 40.5 | 6 | 6.5 | 6 | 6.5 | 34.9 | 95 | 107 | 119 | 7 | 6 | 53.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 38 FT | 25 | 27 | 9 | 8 | 7 | 7.5 | 6 | 6.5 | 40.1 | 49.0 | 49.0 | 49.0 | 7 | 14 | 57.0 | 7 | 14 | 39.5 | 6 | 6 | 6 | 6.5 | 35.0 | 95 | 107 | 119 | 7 | 6 | 53.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 40 FT | 26 | 28 | 10 | 8 | 7 | 7.5 | 6 | 7 | 40.9 | 50.0 | 50.0 | 50.0 | 7 | 13 | 56.0 | 7 | 13 | 38.5 | 6 | 6 | 6 | 7 | 35.5 | 96 | 108 | 120 | 7 | 6 | 53.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 42 FT | 27 | 29 | 10 | 8 | 7 | 7 | 6 | 7 | 41.0 | 51.0 | 51.0 | 51.0 | 7 | 13 | 55.0 | 7 | 13 | 37.5 | 6 | 6 | 6 | 6.5 | 35.8 | 97 | 109 | 121 | 8 | 7.5 | 59.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 44 FT | 27 | 30 | 11 | 8 | 7 | 6.5 | 5 | 6 | 37.9 | 47.0 | 47.0 | 47.0 | 7 | 13 | 54.5 | 7 | 13 | 38.0 | 6 | 6 | 6 | 7 | 36.1 | 98 | 110 | 122 | 8 | 7.5 | 59.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 46 FT | 28 | 31 | 11 | 8 | 7 | 6.5 | 6 | 7.5 | 41.9 | 52.0 | 52.0 | 52.0 | 7 | 12 | 54.0 | 7 | 12 | 37.5 | 6 | 6 | 6 | 7 | 36.4 | 99 | 111 | 123 | 8 | 7 | 59.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 48 FT | 29 | 32 | 11 | 8 | 7 | 6.5 | 6 | 7 | 41.9 | 53.0 | 53.0 | 53.0 | 7 | 12 | 53.5 | 7 | 12 | 37.0 | 6 | 6 | 6 | 6.5 | 36.5 | 100 | 112 | 124 | 8 | 7 | 59.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 50 FT | 29 | 33 | 11 | 8 | 7 | 6.5 | 6 | 7 | 42.0 | 53.0 | 53.0 | 53.0 | 7 | 12 | 53.5 | 7 | 12 | 37.0 | 6 | 6 | 6 | 6.5 | 36.6 | 101 | 113 | 125 | 8 | 7 | 59.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | |

| SPAN (S) = 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|--------|------|---------|-------|------|---------|------|---------|------|------------------|-------|---------|--------|------|---------|----|---------|------|------|------|--------------------------------------|------|----|--|--|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 8 | 9 | 5 | 6 | 5 | 8 | 54.6 | 34.0 | 34.0 | 34.0 | 5 | 13 | 109.0 | 5 | 13 | 30.5 | 5 | 7.5 | 6 | 6 | 76.4 | 114 | 126 | 138 | 6 | 6.5 | 54.0 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 14 | 11 | 8 | 9 | 5 | 6 | 5 | 8 | 54.6 | 34.0 | 34.0 | 34.0 | 5 | 12 | 109.0 | 5 | 12 | 29.5 | 5 | 7.5 | 6 | 6.5 | 71.8 | 115 | 127 | 139 | 6 | 7 | 53.5 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 10 | 10 | 9 | 9 | 5 | 7 | 5 | 6 | 82.4 | 30.0 | 30.0 | 30.0 | 6 | 16 | 84.0 | 6 | 16 | 35.0 | 5 | 7 | 6 | 6.5 | 62.1 | 114 | 126 | 138 | 7 | 7 | 55.5 | 5 | 10.5 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 10 | 11 | 9 | 9 | 5 | 7.5 | 5 | 6 | 56.3 | 30.0 | 30.0 | 30.0 | 6 | 15 | 58.5 | 6 | 15 | 33.5 | 5 | 6.5 | 6 | 6.5 | 58.1 | 115 | 127 | 139 | 6 | 6 | 52.0 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 12 | 10 | 9 | 5 | 7.5 | 5 | 6 | 52.4 | 31.0 | 31.0 | 31.0 | 6 | 15 | 54.5 | 6 | 15 | 33.0 | 5 | 6 | 5 | 6 | 52.1 | 116 | 128 | 140 | 6 | 6 | 51.5 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 11 | 13 | 10 | 9 | 5 | 7.5 | 5 | 6 | 49.6 | 31.0 | 31.0 | 31.0 | 6 | 14 | 52.5 | 6 | 14 | 32.5 | 5 | 6 | 5 | 6 | 50.5 | 117 | 129 | 141 | 6 | 6 | 51.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 12 | 14 | 10 | 9 | 5 | 6.5 | 5 | 6 | 48.1 | 32.0 | 32.0 | 32.0 | 6 | 13 | 52.0 | 6 | 13 | 32.5 | 6 | 8 | 5 | 6 | 49.0 | 118 | 130 | 142 | 6 | 6 | 51.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 14 | 15 | 10 | 9 | 5 | 6 | 5 | 6 | 47.1 | 34.0 | 34.0 | 34.0 | 6 | 14 | 51.5 | 6 | 14 | 32.5 | 6 | 8 | 5 | 6 | 47.9 | 119 | 131 | 143 | 6 | 6 | 51.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 15 | 16 | 10 | 9 | 6 | 8 | 6 | 8 | 55.0 | 35.0 | 35.0 | 35.0 | 6 | 13 | 57.0 | 6 | 13 | 38.5 | 6 | 7.5 | 5 | 6 | 46.9 | 120 | 132 | 144 | 6 | 6 | 51.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 16 | 17 | 10 | 9 | 6 | 8 | 6 | 7.5 | 53.9 | 36.0 | 36.0 | 40.0 | 6 | 13 | 56.5 | 6 | 13 | 38.0 | 6 | 7 | 6 | 7 | 49.0 | 121 | 133 | 145 | 6 | 6 | 51.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 17 | 18 | 11 | 9 | 6 | 7.5 | 6 | 8 | 54.0 | 37.0 | 37.0 | 37.0 | 6 | 13 | 56.0 | 6 | 13 | 38.0 | 6 | 6.5 | 5 | 6 | 45.9 | 122 | 134 | 146 | 6 | 6 | 51.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 18 | 20 | 12 | 9 | 6 | 7 | 6 | 8 | 54.4 | 38.0 | 38.0 | 38.0 | 6 | 13 | 55.5 | 6 | 13 | 38.0 | 6 | 7.5 | 5 | 6.5 | 46.0 | 124 | 136 | 148 | 6 | 6 | 51.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 18 | 20 | 12 | 9 | 6 | 7 | 6 | 8 | 52.1 | 38.0 | 38.0 | 38.0 | 6 | 12 | 54.5 | 6 | 12 | 37.5 | 6 | 6.5 | 5 | 6.5 | 43.5 | 124 | 136 | 148 | 6 | 6 | 51.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 19 | 22 | 12 | 9 | 6 | 6.5 | 6 | 7.5 | 52.1 | 39.0 | 39.0 | 39.0 | 6 | 12 | 54.5 | 6 | 12 | 37.5 | 6 | 7 | 5 | 6.5 | 43.6 | 126 | 138 | 150 | 7 | 7.5 | 54.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 20 | 23 | 12 | 9 | 6 | 6.5 | 6 | 7 | 52.1 | 40.0 | 40.0 | 40.0 | 6 | 12 | 54.0 | 6 | 12 | 37.5 | 6 | 7 | 5 | 6 | 43.8 | 127 | 139 | 151 | 7 | 7 | 54.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 21 | 24 | 13 | 9 | 6 | 6 | 6 | 7.5 | 52.8 | 41.0 | 41.0 | 41.0 | 6 | 12 | 53.0 | 6 | 12 | 37.0 | 6 | 6.5 | 5 | 6 | 44.1 | 128 | 140 | 152 | 7 | 7 | 54.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 22 | 25 | 13 | 9 | 6 | 6 | 6 | 7 | 52.8 | 42.0 | 42.0 | 42.0 | 7 | 15 | 56.5 | 7 | 15 | 41.0 | 6 | 6.5 | 5 | 6 | 44.3 | 129 | 141 | 153 | 7 | 6.5 | 54.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 23 | 26 | 13 | 9 | 6 | 6 | 6 | 6.5 | 52.8 | 43.0 | 43.0 | 43.0 | 7 | 15 | 57.0 | 7 | 15 | 40.0 | 6 | 6.5 | 5 | 6 | 44.4 | 130 | 142 | 154 | 7 | 6.5 | 54.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 24 | 27 | 14 | 9 | 7 | 8 | 6 | 7 | 53.4 | 44.0 | 44.0 | 44.0 | 7 | 14 | 56.0 | 7 | 14 | 39.5 | 6 | 6.5 | 5 | 6 | 44.8 | 131 | 143 | 155 | 7 | 6 | 54.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 25 | 28 | 14 | 9 | 7 | 7.5 | 6 | 7 | 53.4 | 45.0 | 45.0 | 45.0 | 7 | 14 | 55.0 | 7 | 14 | 38.5 | 6 | 6.5 | 5 | 6 | 44.9 | 132 | 144 | 156 | 7 | 6 | 54.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 25 | 29 | 14 | 9 | 7 | 7 | 6 | 6 | 53.4 | 45.0 | 49.0 | 49.0 | 7 | 14 | 55.0 | 7 | 14 | 39.0 | 6 | 6 | 6 | 8.5 | 47.9 | 133 | 145 | 157 | 8 | 7.5 | 60.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 26 | 30 | 15 | 9 | 7 | 7 | 6 | 6.5 | 54.1 | 50.0 | 50.0 | 50.0 | 7 | 13 | 54.0 | 7 | 13 | 38.0 | 6 | 6 | 6 | 8 | 48.4 | 134 | 146 | 158 | 8 | 7.5 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 27 | 31 | 15 | 9 | 7 | 7 | 6 | 6.5 | 54.1 | 51.0 | 51.0 | 51.0 | 7 | 13 | 54.0 | 7 | 13 | 37.0 | 6 | 6 | 6 | 7.5 | 48.6 | 135 | 147 | 159 | 8 | 7 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 27 | 32 | 16 | 9 | 7 | 6.5 | 6 | 6.5 | 55.0 | 51.0 | 51.0 | 51.0 | 7 | 13 | 53.5 | 7 | 13 | 37.5 | 6 | 6 | 6 | 7.5 | 48.9 | 136 | 148 | 160 | 8 | 7 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 28 | 32 | 16 | 9 | 7 | 6.5 | 6 | 6 | 54.9 | 52.0 | 52.0 | 52.0 | 7 | 13 | 53.0 | 7 | 13 | 37.0 | 7 | 8 | 6 | 7.5 | 49.0 | 136 | 148 | 160 | 8 | 7 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 29 | 33 | 17 | 9 | 7 | 6.5 | 6 | 6.5 | 55.6 | 53.0 | 53.0 | 53.0 | 7 | 13 | 52.5 | 7 | 13 | 37.0 | 7 | 7.5 | 6 | 7 | 49.5 | 137 | 149 | 161 | 8 | 7 | 60.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|-------|---------|------|------|------------------|------|---------|--------|--------|--------|------|------|---------|---------------------------------------|------|---------|------|---------|-----------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=12' | HT=13' | HT=14' | | | | | | | | | | HT=12' | HT=13' | HT=14' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 12 | 9 | 11 | 5 | 6 | 5 | 6 | 55.6 | 34.0 | 34.0 | 34.0 | 5 | 13 | 110.0 | 5 | 13 | 30.5 | 5 | 8 | 6 | 6 | 94.6 | 152 | 164 | 176 | 5 | 6 | 51.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 14 | 12 | 9 | 11 | 5 | 6 | 6 | 7.5 | 55.6 | 34.0 | 34.0 | 38.0 | 5 | 12 | 110.0 | 5 | 12 | 30.0 | 5 | 7.5 | 6 | 6 | 89.4 | 152 | 164 | 176 | 5 | 6 | 51.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 10 | 12 | 10 | 11 | 5 | 7 | 6 | 7 | 58.3 | 30.0 | 30.0 | 34.0 | 6 | 16 | 112.5 | 6 | 16 | 35.5 | 5 | 7 | 6 | 6.5 | 83.4 | 152 | 164 | 176 | 6 | 7 | 53.5 | 5 | 11.5 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 10 | 12 | 10 | 11 | 5 | 7.5 | 6 | 6.5 | 78.8 | 30.0 | 34.0 | 34.0 | 6 | 15 | 57.5 | 6 | 15 | 34.0 | 5 | 6.5 | 6 | 6 | 77.1 | 152 | 164 | 176 | 6 | 6.5 | 52.5 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 10 | 13 | 10 | 11 | 5 | 7.5 | 6 | 6 | 70.1 | 34.0 | 34.0 | 34.0 | 6 | 14 | 54.0 | 6 | 14 | 33.5 | 5 | 6 | 6 | 6 | 74.1 | 153 | 165 | 177 | 6 | 6.5 | 52.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 11 | 13 | 11 | 11 | 5 | 7.5 | 6 | 7 | 67.0 | 31.0 | 31.0 | 35.0 | 6 | 14 | 52.5 | 6 | 14 | 33.0 | 5 | 6 | 6 | 6 | 69.9 | 153 | 165 | 177 | 6 | 6 | 51.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 12 | 14 | 12 | 11 | 5 | 7 | 6 | 8 | 64.6 | 32.0 | 32.0 | 36.0 | 6 | 14 | 51.5 | 6 | 14 | 33.0 | 6 | 8 | 6 | 7 | 67.6 | 154 | 166 | 178 | 6 | 6 | 51.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 13 | 15 | 12 | 11 | 5 | 6.5 | 6 | 7 | 63.4 | 33.0 | 37.0 | 37.0 | 6 | 13 | 51.0 | 6 | 13 | 33.0 | 6 | 7.5 | 6 | 6.5 | 66.4 | 155 | 167 | 179 | 6 | 6 | 51.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 14 | 16 | 13 | 11 | 5 | 6 | 6 | 7 | 62.3 | 34.0 | 38.0 | 38.0 | 6 | 13 | 51.0 | 6 | 13 | 33.0 | 6 | 7 | 6 | 7 | 64.8 | 156 | 168 | 180 | 6 | 6 | 51.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 15 | 17 | 13 | 11 | 6 | 8 | 6 | 6.5 | 67.6 | 35.0 | 39.0 | 39.0 | 6 | 12 | 56.5 | 6 | 12 | 38.5 | 6 | 6.5 | 6 | 6 | 63.8 | 157 | 169 | 181 | 6 | 6 | 51.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 16 | 19 | 14 | 11 | 6 | 8 | 6 | 6.5 | 67.4 | 36.0 | 40.0 | 40.0 | 6 | 12 | 56.0 | 6 | 12 | 38.5 | 6 | 7.5 | 6 | 6.5 | 63.8 | 159 | 171 | 183 | 6 | 6 | 51.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 17 | 20 | 14 | 11 | 6 | 7.5 | 6 | 6 | 67.3 | 37.0 | 41.0 | 41.0 | 6 | 12 | 55.5 | 6 | 12 | 38.5 | 6 | 7 | 6 | 6 | 63.5 | 160 | 172 | 184 | 6 | 6 | 51.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 18 | 21 | 15 | 11 | 6 | 7 | 6 | 6.5 | 67.4 | 42.0 | 42.0 | 42.0 | 6 | 12 | 55.0 | 6 | 12 | 38.5 | 6 | 7 | 6 | 6.5 | 63.4 | 161 | 173 | 185 | 7 | 7.5 | 54.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 19 | 22 | 15 | 11 | 6 | 6.5 | 6 | 6.5 | 65.3 | 43.0 | 43.0 | 43.0 | 6 | 13 | 54.5 | 6 | 13 | 38.0 | 6 | 7 | 6 | 7 | 61.1 | 162 | 174 | 186 | 7 | 7.5 | 54.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 20 | 23 | 15 | 11 | 6 | 6.5 | 6 | 6 | 65.3 | 44.0 | 44.0 | 44.0 | 6 | 12 | 54.0 | 6 | 12 | 38.0 | 6 | 7 | 6 | 6.5 | 61.3 | 163 | 175 | 187 | 7 | 7 | 54.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 21 | 24 | 16 | 11 | 6 | 6.5 | 6 | 6 | 65.8 | 45.0 | 45.0 | 45.0 | 6 | 12 | 53.0 | 6 | 12 | 37.0 | 6 | 6.5 | 6 | 7 | 61.4 | 164 | 176 | 188 | 7 | 7 | 54.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 22 | 25 | 16 | 11 | 6 | 6 | 7 | 7.5 | 70.8 | 46.0 | 46.0 | 46.0 | 7 | 15 | 57.5 | 7 | 15 | 41.0 | 6 | 6.5 | 6 | 6.5 | 61.6 | 165 | 177 | 189 | 7 | 6.5 | 54.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 23 | 26 | 17 | 11 | 6 | 6 | 6 | 6 | 66.4 | 47.0 | 47.0 | 47.0 | 7 | 15 | 56.5 | 7 | 15 | 40.0 | 6 | 6.5 | 6 | 7 | 61.9 | 166 | 178 | 190 | 7 | 6.5 | 54.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 23 | 27 | 17 | 11 | 7 | 7.5 | 7 | 7 | 71.3 | 47.0 | 47.0 | 47.0 | 7 | 15 | 56.5 | 7 | 15 | 41.0 | 6 | 6.5 | 6 | 6.5 | 62.0 | 167 | 179 | 191 | 7 | 6 | 54.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 24 | 28 | 18 | 11 | 7 | 7.5 | 7 | 7.5 | 71.8 | 48.0 | 48.0 | 48.0 | 7 | 14 | 55.5 | 7 | 14 | 40.0 | 6 | 6 | 6 | 6.5 | 62.4 | 168 | 180 | 192 | 7 | 6 | 54.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 25 | 29 | 19 | 11 | 7 | 7.5 | 7 | 7.5 | 72.4 | 49.0 | 49.0 | 49.0 | 7 | 14 | 55.0 | 7 | 14 | 39.0 | 6 | 6 | 6 | 6.5 | 62.6 | 169 | 181 | 193 | 8 | 7.5 | 60.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 26 | 30 | 19 | 11 | 7 | 7.5 | 7 | 7 | 72.5 | 50.0 | 50.0 | 50.0 | 7 | 13 | 54.5 | 7 | 13 | 38.0 | 6 | 6 | 6 | 6.5 | 62.9 | 170 | 182 | 194 | 8 | 7.5 | 60.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 27 | 31 | 20 | 11 | 7 | 7 | 7 | 7.5 | 73.0 | 51.0 | 51.0 | 51.0 | 7 | 14 | 54.0 | 7 | 14 | 38.0 | 6 | 6 | 6 | 6 | 63.3 | 171 | 183 | 195 | 8 | 7 | 60.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 28 | 32 | 20 | 11 | 7 | 7 | 7 | 6.5 | 73.1 | 52.0 | 52.0 | 52.0 | 7 | 14 | 53.5 | 7 | 14 | 38.0 | 6 | 6 | 6 | 6 | 63.5 | 172 | 184 | 196 | 8 | 7 | 60.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 28 | 32 | 21 | 11 | 7 | 6.5 | 7 | 6.5 | 73.6 | 52.0 | 52.0 | 52.0 | 7 | 14 | 53.5 | 7 | 14 | 37.5 | 7 | 7 | 6 | 6 | 63.5 | 172 | 184 | 196 | 8 | 7 | 60.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 28 | 33 | 22 | 11 | 7 | 6.5 | 7 | 6.5 | 74.1 | 52.0 | 52.0 | 52.0 | 7 | 13 | 53.5 | 7 | 13 | 37.5 | 7 | 7.5 | 6 | 6 | 63.9 | 173 | 185 | 197 | 8 | 7 | 60.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

CONCRETE DOUBLE BOX CULVERT
MEMBER THICKNESS BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 11 FEET
HEIGHT (HT): 12 THRU 14 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
17 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|---------|-------|------|------------------|------|---------|------|------|------|---------|-------|-------|---------|------------------------------------|---------|-----------|------|------|------|------|----|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 8 | 8 | 5 | 6 | 4 | 6 | 56.1 | 30.0 | 30.0 | 30.0 | 5 | 12 | 115.0 | 5 | 12 | 31.5 | 5 | 7.5 | 5 | 6.5 | 52.4 | 78 | 90 | 102 | 6 | 6.5 | 56.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 2 FT | 15 | 11 | 8 | 8 | 6 | 8 | 4 | 6.5 | 59.1 | 31.0 | 31.0 | 31.0 | 6 | 16 | 118.0 | 6 | 16 | 39.0 | 5 | 7.5 | 5 | 7.5 | 47.9 | 79 | 91 | 103 | 6 | 6.5 | 56.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 4 FT | 11 | 10 | 8 | 8 | 5 | 6.5 | 5 | 7 | 43.6 | 31.0 | 31.0 | 31.0 | 6 | 15 | 77.5 | 6 | 15 | 36.5 | 5 | 6.5 | 5 | 6 | 42.6 | 78 | 90 | 102 | 7 | 6.5 | 58.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 6 FT | 11 | 11 | 8 | 8 | 5 | 7 | 5 | 6.5 | 40.9 | 27.0 | 31.0 | 31.0 | 6 | 14 | 63.0 | 6 | 14 | 35.0 | 5 | 6.5 | 5 | 7 | 39.3 | 79 | 91 | 103 | 7 | 6.5 | 57.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 8 FT | 11 | 13 | 8 | 8 | 5 | 7 | 5 | 6 | 39.1 | 27.0 | 27.0 | 31.0 | 6 | 12 | 58.0 | 6 | 12 | 34.0 | 5 | 6 | 5 | 8.5 | 36.3 | 81 | 93 | 105 | 6 | 6 | 54.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 10 FT | 12 | 14 | 8 | 8 | 5 | 6.5 | 5 | 6.5 | 37.0 | 28.0 | 28.0 | 32.0 | 6 | 12 | 56.5 | 6 | 12 | 33.5 | 6 | 8 | 5 | 8.5 | 34.5 | 82 | 94 | 106 | 6 | 6 | 54.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 12 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8 | 34.6 | 30.0 | 34.0 | 34.0 | 6 | 13 | 55.5 | 6 | 13 | 33.5 | 6 | 7.5 | 5 | 8.5 | 33.8 | 83 | 95 | 107 | 7 | 7 | 57.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 14 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 7.5 | 38.4 | 31.0 | 35.0 | 35.0 | 6 | 12 | 61.0 | 6 | 12 | 39.5 | 6 | 7.5 | 5 | 8 | 32.9 | 84 | 96 | 108 | 7 | 7 | 57.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 16 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 7 | 37.5 | 32.0 | 36.0 | 36.0 | 7 | 16 | 65.5 | 7 | 16 | 44.5 | 6 | 7 | 5 | 7 | 32.3 | 85 | 97 | 109 | 7 | 6.5 | 57.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 18 FT | 17 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 37.0 | 37.0 | 37.0 | 37.0 | 7 | 15 | 65.0 | 7 | 15 | 44.0 | 6 | 7 | 5 | 6.5 | 31.6 | 87 | 99 | 111 | 7 | 7 | 57.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | |
| 20 FT | 18 | 20 | 8 | 8 | 6 | 7 | 5 | 6.5 | 36.4 | 38.0 | 38.0 | 38.0 | 7 | 15 | 64.5 | 7 | 15 | 44.0 | 6 | 6.5 | 5 | 6 | 31.3 | 88 | 100 | 112 | 7 | 7 | 57.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | |
| 22 FT | 19 | 21 | 8 | 8 | 6 | 6 | 5 | 6 | 36.0 | 39.0 | 39.0 | 39.0 | 7 | 14 | 64.0 | 7 | 14 | 44.0 | 6 | 6.5 | 6 | 7.5 | 34.1 | 89 | 101 | 113 | 7 | 7 | 57.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | |
| 24 FT | 21 | 22 | 8 | 8 | 6 | 6 | 6 | 7 | 39.6 | 45.0 | 45.0 | 45.0 | 7 | 15 | 63.5 | 7 | 15 | 44.0 | 6 | 6.5 | 6 | 7 | 34.4 | 90 | 102 | 114 | 7 | 7 | 56.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | |
| 26 FT | 21 | 23 | 8 | 8 | 6 | 6 | 6 | 7 | 38.3 | 45.0 | 45.0 | 45.0 | 7 | 14 | 63.0 | 7 | 14 | 43.5 | 6 | 6.5 | 6 | 6.5 | 32.8 | 91 | 103 | 115 | 7 | 7 | 56.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | |
| 28 FT | 23 | 24 | 8 | 8 | 6 | 6 | 6 | 6 | 38.3 | 47.0 | 47.0 | 47.0 | 7 | 15 | 62.0 | 7 | 15 | 43.0 | 6 | 6 | 6 | 6 | 33.0 | 92 | 104 | 116 | 7 | 7 | 56.5 | 5 | 12 | 5 | 9 | 0 | | | | | | | |
| 30 FT | 23 | 25 | 8 | 8 | 7 | 7 | 6 | 6 | 38.3 | 47.0 | 47.0 | 47.0 | 7 | 14 | 62.0 | 7 | 14 | 43.5 | 6 | 6 | 6 | 6 | 33.0 | 93 | 105 | 117 | 7 | 6.5 | 56.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | |
| 32 FT | 25 | 27 | 9 | 8 | 7 | 7.5 | 6 | 6.5 | 39.1 | 49.0 | 49.0 | 49.0 | 7 | 14 | 61.0 | 7 | 14 | 41.5 | 6 | 6 | 6 | 6.5 | 33.8 | 95 | 107 | 119 | 7 | 6 | 56.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | |
| 34 FT | 25 | 28 | 9 | 8 | 7 | 6.5 | 6 | 6.5 | 39.3 | 49.0 | 49.0 | 49.0 | 7 | 13 | 61.0 | 7 | 13 | 42.5 | 6 | 6 | 6 | 6 | 33.8 | 96 | 108 | 120 | 7 | 6 | 56.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | |
| 36 FT | 26 | 29 | 9 | 8 | 7 | 6.5 | 6 | 6.5 | 39.3 | 50.0 | 50.0 | 50.0 | 7 | 13 | 60.0 | 7 | 13 | 41.5 | 6 | 6 | 6 | 6 | 33.9 | 97 | 109 | 121 | 8 | 7.5 | 62.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | |
| 38 FT | 27 | 30 | 10 | 8 | 7 | 6.5 | 6 | 7 | 40.1 | 51.0 | 51.0 | 51.0 | 7 | 13 | 59.0 | 7 | 13 | 41.0 | 6 | 6 | 6 | 6.5 | 34.5 | 98 | 110 | 122 | 8 | 7.5 | 62.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | |
| 40 FT | 28 | 31 | 10 | 8 | 7 | 6.5 | 6 | 6.5 | 40.1 | 52.0 | 52.0 | 52.0 | 7 | 12 | 58.5 | 7 | 12 | 40.0 | 7 | 8 | 6 | 6 | 34.6 | 99 | 111 | 123 | 8 | 7 | 62.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | |
| 42 FT | 29 | 32 | 10 | 8 | 7 | 6.5 | 6 | 6.5 | 40.1 | 53.0 | 53.0 | 53.0 | 7 | 12 | 57.5 | 7 | 12 | 39.0 | 7 | 8 | 6 | 6 | 34.9 | 100 | 112 | 124 | 8 | 7 | 62.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | |
| 44 FT | 30 | 33 | 10 | 8 | 7 | 6.5 | 6 | 6 | 40.3 | 54.0 | 54.0 | 54.0 | 7 | 12 | 56.5 | 7 | 12 | 38.5 | 7 | 7.5 | 7 | 6.5 | 38.1 | 101 | 113 | 125 | 8 | 6.5 | 62.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | |
| 46 FT | 31 | 34 | 10 | 8 | 7 | 6 | 6 | 6 | 40.3 | 55.0 | 55.0 | 55.0 | 8 | 15 | 64.0 | 8 | 15 | 45.5 | 7 | 7.5 | 7 | 6.5 | 38.3 | 102 | 114 | 126 | 8 | 6.5 | 62.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | |
| 48 FT | 31 | 34 | 11 | 8 | 7 | 6 | 6 | 6.5 | 41.0 | 55.0 | 55.0 | 55.0 | 8 | 15 | 64.0 | 8 | 15 | 46.0 | 7 | 6.5 | 6 | 6 | 35.6 | 102 | 114 | 126 | 8 | 6.5 | 62.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | |
| 50 FT | 32 | 35 | 11 | 8 | 8 | 7.5 | 6 | 6.5 | 41.0 | 56.0 | 56.0 | 56.0 | 8 | 15 | 63.5 | 8 | 15 | 45.5 | 7 | 7 | 6 | 6 | 35.8 | 103 | 115 | 127 | 8 | 6.5 | 62.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|------|------|------|---------------|-------|---------|--------|------|------|------|------|---------|----|---------|------|------------------|-------|---------|--------|------|------|------|------|---------|------|------|-----|-----------|---|------|---|--------------------------------------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 11 | 8 | 9 | 5 | 6 | 5 | 8 | 58.3 | 34.0 | 34.0 | 34.0 | 5 | 12 | 117.5 | 5 | 12 | 32.0 | 5 | 7.5 | 6 | 6.5 | 77.5 | 115 | 127 | 139 | 6 | 7 | 57.0 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 12 | 8 | 9 | 6 | 8 | 5 | 8 | 62.3 | 35.0 | 35.0 | 35.0 | 6 | 16 | 121.5 | 6 | 16 | 39.5 | 5 | 7.5 | 6 | 7 | 71.9 | 116 | 128 | 140 | 6 | 7 | 56.5 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 11 | 9 | 9 | 5 | 6.5 | 6 | 7 | 76.1 | 31.0 | 31.0 | 35.0 | 6 | 15 | 86.0 | 6 | 15 | 37.0 | 5 | 6.5 | 6 | 7 | 61.8 | 115 | 127 | 139 | 6 | 6 | 56.0 | 5 | 11.5 | 5 | 10.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 12 | 9 | 9 | 5 | 7 | 6 | 7 | 59.0 | 31.0 | 31.0 | 35.0 | 6 | 14 | 63.0 | 6 | 14 | 35.5 | 5 | 6 | 6 | 7 | 57.6 | 116 | 128 | 140 | 6 | 6 | 55.0 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 13 | 9 | 9 | 5 | 7 | 6 | 7 | 54.0 | 31.0 | 31.0 | 35.0 | 6 | 13 | 58.0 | 6 | 13 | 34.5 | 5 | 6 | 6 | 7 | 54.5 | 117 | 129 | 141 | 6 | 6 | 55.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 14 | 10 | 9 | 5 | 7 | 5 | 6 | 49.0 | 32.0 | 32.0 | 32.0 | 6 | 12 | 56.0 | 6 | 12 | 34.0 | 6 | 8 | 5 | 6.5 | 49.3 | 118 | 130 | 142 | 7 | 7 | 57.5 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 15 | 10 | 9 | 5 | 6.5 | 6 | 7.5 | 50.1 | 33.0 | 33.0 | 33.0 | 6 | 12 | 55.0 | 6 | 12 | 33.5 | 6 | 7.5 | 5 | 6.5 | 47.6 | 119 | 131 | 143 | 7 | 7 | 57.5 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 15 | 16 | 10 | 9 | 6 | 8 | 5 | 6 | 50.6 | 35.0 | 35.0 | 35.0 | 6 | 12 | 60.5 | 6 | 12 | 39.5 | 6 | 7 | 5 | 6 | 46.4 | 120 | 132 | 144 | 7 | 7 | 57.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 16 | 17 | 10 | 9 | 6 | 8 | 6 | 7.5 | 53.8 | 36.0 | 36.0 | 36.0 | 6 | 12 | 60.0 | 6 | 12 | 39.5 | 6 | 6.5 | 5 | 6 | 45.4 | 121 | 133 | 145 | 7 | 6.5 | 57.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 17 | 19 | 10 | 9 | 6 | 7.5 | 6 | 7 | 53.1 | 37.0 | 37.0 | 41.0 | 7 | 16 | 64.5 | 7 | 16 | 44.5 | 6 | 7 | 6 | 7.5 | 47.8 | 123 | 135 | 147 | 7 | 7 | 57.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 11 | 9 | 6 | 7 | 6 | 7.5 | 53.1 | 38.0 | 38.0 | 38.0 | 7 | 15 | 64.0 | 7 | 15 | 44.0 | 6 | 6.5 | 5 | 6 | 44.6 | 124 | 136 | 148 | 7 | 7 | 57.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 19 | 21 | 12 | 9 | 6 | 6.5 | 6 | 7.5 | 53.5 | 39.0 | 39.0 | 39.0 | 7 | 15 | 63.5 | 7 | 15 | 44.0 | 6 | 6.5 | 5 | 6.5 | 44.8 | 125 | 137 | 149 | 7 | 7 | 57.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 20 | 23 | 12 | 9 | 6 | 6.5 | 6 | 7 | 53.4 | 40.0 | 40.0 | 40.0 | 7 | 15 | 63.0 | 7 | 15 | 44.0 | 6 | 6.5 | 5 | 6.5 | 44.6 | 127 | 139 | 151 | 7 | 7 | 57.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 21 | 23 | 12 | 9 | 6 | 6 | 6 | 7.5 | 51.4 | 41.0 | 41.0 | 41.0 | 7 | 15 | 62.0 | 7 | 15 | 43.5 | 6 | 6 | 5 | 6.5 | 42.8 | 127 | 139 | 151 | 7 | 7 | 57.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 22 | 25 | 12 | 9 | 6 | 6 | 6 | 7 | 51.4 | 42.0 | 42.0 | 42.0 | 7 | 15 | 61.5 | 7 | 15 | 43.5 | 6 | 6.5 | 5 | 6.5 | 42.9 | 129 | 141 | 153 | 7 | 6.5 | 57.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 23 | 26 | 12 | 9 | 7 | 7.5 | 6 | 6.5 | 51.3 | 43.0 | 43.0 | 43.0 | 7 | 15 | 61.0 | 7 | 15 | 43.5 | 6 | 6 | 5 | 6 | 43.0 | 130 | 142 | 154 | 7 | 6.5 | 57.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 24 | 27 | 13 | 9 | 7 | 7.5 | 6 | 7 | 52.0 | 44.0 | 44.0 | 44.0 | 7 | 14 | 60.5 | 7 | 14 | 42.5 | 6 | 6 | 5 | 6 | 43.4 | 131 | 143 | 155 | 7 | 6 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 25 | 28 | 13 | 9 | 7 | 7 | 6 | 7 | 52.0 | 45.0 | 45.0 | 45.0 | 7 | 14 | 59.5 | 7 | 14 | 41.5 | 6 | 6 | 5 | 6 | 43.5 | 132 | 144 | 156 | 7 | 6 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 26 | 29 | 13 | 9 | 7 | 7 | 6 | 6 | 51.9 | 46.0 | 50.0 | 50.0 | 7 | 13 | 58.5 | 7 | 13 | 41.0 | 6 | 6 | 6 | 8.5 | 46.6 | 133 | 145 | 157 | 8 | 7.5 | 63.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 27 | 30 | 14 | 9 | 7 | 7 | 6 | 6.5 | 52.6 | 47.0 | 51.0 | 51.0 | 7 | 13 | 57.5 | 7 | 13 | 40.0 | 7 | 8 | 6 | 8 | 47.1 | 134 | 146 | 158 | 8 | 7.5 | 63.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 28 | 31 | 14 | 9 | 7 | 6.5 | 6 | 6.5 | 52.6 | 52.0 | 52.0 | 52.0 | 7 | 12 | 56.5 | 7 | 12 | 39.0 | 7 | 7.5 | 6 | 7.5 | 47.3 | 135 | 147 | 159 | 8 | 7 | 63.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 28 | 32 | 15 | 9 | 7 | 6 | 6 | 6.5 | 53.5 | 52.0 | 52.0 | 52.0 | 7 | 12 | 56.5 | 7 | 12 | 39.5 | 7 | 7.5 | 6 | 7.5 | 47.5 | 136 | 148 | 160 | 8 | 7 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 29 | 33 | 15 | 9 | 7 | 6 | 6 | 6.5 | 53.4 | 53.0 | 53.0 | 53.0 | 7 | 12 | 56.0 | 7 | 12 | 38.5 | 7 | 7.5 | 6 | 7 | 47.8 | 137 | 149 | 161 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 30 | 34 | 15 | 9 | 7 | 6 | 6 | 6 | 53.4 | 54.0 | 54.0 | 54.0 | 7 | 12 | 55.5 | 7 | 12 | 38.0 | 7 | 7.5 | 6 | 7 | 47.9 | 138 | 150 | 162 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 31 | 35 | 16 | 9 | 7 | 6 | 6 | 6.5 | 54.1 | 55.0 | 55.0 | 55.0 | 7 | 12 | 55.0 | 7 | 12 | 37.5 | 7 | 7 | 6 | 6.5 | 48.4 | 139 | 151 | 163 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 31 | 36 | 16 | 9 | 8 | 7.5 | 6 | 6 | 54.3 | 55.0 | 55.0 | 55.0 | 7 | 12 | 55.0 | 7 | 12 | 37.5 | 7 | 7 | 6 | 6.5 | 48.4 | 140 | 152 | 164 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 12 FT OR 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|---------|-------|---------|------|------------------|------|------|----|---------|--------|---------|------|---------|------------------------------|------|------|-----------|----|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=12' | HT=13' | | | | | | | | | | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 11 | 9 | 10 | 5 | 6 | 5 | 6.5 | 59.0 | 34.0 | 34.0 | 5 | 12 | 118.0 | 5 | 12 | 32.5 | 5 | 7 | 6 | 6 | 88.9 | 151 | 163 | 6 | 6.5 | 57.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 12 | 9 | 10 | 6 | 8 | 5 | 7 | 63.0 | 35.0 | 35.0 | 6 | 16 | 122.0 | 6 | 16 | 39.5 | 5 | 7 | 6 | 6 | 83.6 | 152 | 164 | 6 | 7 | 57.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 12 | 9 | 10 | 5 | 6.5 | 6 | 7 | 61.0 | 35.0 | 35.0 | 6 | 15 | 120.0 | 6 | 15 | 37.0 | 5 | 6.5 | 6 | 6 | 76.5 | 152 | 164 | 6 | 6.5 | 56.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 12 | 9 | 10 | 5 | 7 | 6 | 6.5 | 73.5 | 35.0 | 35.0 | 6 | 14 | 63.5 | 6 | 14 | 35.5 | 5 | 6 | 6 | 6 | 70.0 | 152 | 164 | 6 | 6 | 55.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 13 | 10 | 10 | 5 | 7 | 6 | 7 | 63.9 | 31.0 | 35.0 | 6 | 13 | 58.0 | 6 | 13 | 34.5 | 5 | 6 | 6 | 6.5 | 65.8 | 153 | 165 | 6 | 6 | 55.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 14 | 10 | 10 | 5 | 7 | 6 | 7 | 61.6 | 36.0 | 36.0 | 6 | 12 | 56.5 | 6 | 12 | 34.5 | 6 | 8 | 6 | 6 | 63.1 | 154 | 166 | 7 | 7 | 57.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 15 | 11 | 10 | 5 | 6.5 | 6 | 7.5 | 59.9 | 33.0 | 37.0 | 6 | 12 | 55.0 | 6 | 12 | 34.0 | 6 | 7.5 | 6 | 6.5 | 61.4 | 155 | 167 | 7 | 7 | 57.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 14 FT | 14 | 16 | 12 | 10 | 5 | 6 | 6 | 7.5 | 58.8 | 34.0 | 38.0 | 6 | 12 | 54.5 | 6 | 12 | 34.0 | 6 | 7 | 6 | 7.5 | 60.0 | 156 | 168 | 7 | 7 | 57.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 16 FT | 16 | 18 | 12 | 10 | 6 | 8 | 6 | 7 | 64.1 | 36.0 | 40.0 | 6 | 12 | 60.0 | 6 | 12 | 40.0 | 6 | 7 | 6 | 7.5 | 59.5 | 158 | 170 | 6 | 6 | 54.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 18 FT | 17 | 19 | 12 | 10 | 6 | 7.5 | 6 | 6.5 | 63.1 | 37.0 | 41.0 | 6 | 12 | 59.5 | 6 | 12 | 39.5 | 6 | 7 | 6 | 6.5 | 58.5 | 159 | 171 | 7 | 7 | 57.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 13 | 10 | 6 | 7 | 6 | 6.5 | 62.6 | 38.0 | 42.0 | 6 | 12 | 58.5 | 6 | 12 | 39.5 | 6 | 6.5 | 6 | 7.5 | 57.9 | 160 | 172 | 7 | 7 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 22 FT | 19 | 21 | 13 | 10 | 6 | 6.5 | 6 | 6.5 | 62.3 | 39.0 | 43.0 | 7 | 16 | 63.0 | 7 | 16 | 44.5 | 6 | 6 | 6 | 6.5 | 57.5 | 161 | 173 | 7 | 7 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 24 FT | 20 | 23 | 14 | 10 | 6 | 6.5 | 6 | 6.5 | 62.5 | 40.0 | 44.0 | 7 | 16 | 62.5 | 7 | 16 | 44.0 | 6 | 6.5 | 6 | 7.5 | 57.8 | 163 | 175 | 7 | 7 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 26 FT | 21 | 24 | 14 | 10 | 6 | 6 | 6 | 6 | 62.3 | 41.0 | 45.0 | 7 | 15 | 62.0 | 7 | 15 | 44.0 | 6 | 6.5 | 6 | 7 | 57.6 | 164 | 176 | 7 | 7 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 28 FT | 22 | 25 | 14 | 10 | 6 | 6 | 6 | 6 | 59.8 | 42.0 | 46.0 | 7 | 15 | 61.0 | 7 | 15 | 43.5 | 6 | 6.5 | 6 | 7.5 | 55.1 | 165 | 177 | 7 | 6.5 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 30 FT | 23 | 26 | 15 | 10 | 7 | 8 | 6 | 6 | 60.3 | 47.0 | 47.0 | 7 | 15 | 60.0 | 7 | 15 | 42.5 | 6 | 6 | 6 | 7.5 | 55.4 | 166 | 178 | 7 | 6.5 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 32 FT | 24 | 27 | 15 | 10 | 7 | 7.5 | 6 | 6 | 60.3 | 48.0 | 48.0 | 7 | 14 | 59.5 | 7 | 14 | 42.0 | 6 | 6 | 6 | 7.5 | 55.5 | 167 | 179 | 7 | 6 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 34 FT | 25 | 28 | 16 | 10 | 7 | 7.5 | 6 | 6 | 60.9 | 49.0 | 49.0 | 7 | 14 | 58.5 | 7 | 14 | 41.0 | 6 | 6 | 6 | 7.5 | 55.8 | 168 | 180 | 7 | 6 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 36 FT | 25 | 29 | 16 | 10 | 7 | 6.5 | 7 | 7.5 | 65.8 | 49.0 | 49.0 | 7 | 13 | 58.5 | 7 | 13 | 41.5 | 6 | 6 | 6 | 7.5 | 55.8 | 169 | 181 | 8 | 7.5 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 38 FT | 26 | 30 | 17 | 10 | 7 | 7 | 6 | 6 | 61.5 | 50.0 | 50.0 | 7 | 13 | 57.5 | 7 | 13 | 40.5 | 7 | 7.5 | 6 | 7 | 56.1 | 170 | 182 | 8 | 7.5 | 63.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 40 FT | 27 | 31 | 17 | 10 | 7 | 6.5 | 7 | 7.5 | 66.5 | 51.0 | 51.0 | 7 | 13 | 57.0 | 7 | 13 | 40.0 | 7 | 7.5 | 6 | 7 | 56.3 | 171 | 183 | 8 | 7 | 63.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 42 FT | 28 | 32 | 18 | 10 | 7 | 6.5 | 7 | 7.5 | 67.1 | 52.0 | 52.0 | 7 | 12 | 56.5 | 7 | 12 | 39.0 | 7 | 7.5 | 6 | 6.5 | 56.6 | 172 | 184 | 8 | 7 | 63.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 44 FT | 29 | 33 | 18 | 10 | 7 | 6.5 | 7 | 7 | 67.1 | 53.0 | 53.0 | 7 | 12 | 56.0 | 7 | 12 | 38.0 | 7 | 7.5 | 6 | 6.5 | 56.9 | 173 | 185 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 46 FT | 29 | 34 | 19 | 10 | 7 | 6 | 7 | 7.5 | 67.9 | 53.0 | 53.0 | 7 | 12 | 56.0 | 7 | 12 | 38.5 | 7 | 7.5 | 6 | 6.5 | 57.0 | 174 | 186 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 48 FT | 30 | 35 | 19 | 10 | 7 | 6 | 7 | 6.5 | 67.9 | 54.0 | 54.0 | 7 | 12 | 55.0 | 7 | 12 | 38.0 | 7 | 7 | 6 | 6.5 | 57.3 | 175 | 187 | 8 | 6.5 | 63.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 50 FT | 31 | 36 | 20 | 10 | 7 | 6 | 7 | 7 | 68.6 | 55.0 | 55.0 | 7 | 13 | 54.5 | 7 | 13 | 37.5 | 7 | 7 | 6 | 6.5 | 57.6 | 176 | 188 | 8 | 6 | 63.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|---------|-------|---------|------|------------------|------|------|------|---------|------|---------|--------|---------|------------------------------|------|------|-----------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=14' | HT=15' | | | | | | | | | | | | HT=14' | HT=15' | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 12 | 10 | 12 | 5 | 6 | 5 | 6 | 60.0 | 34.0 | 34.0 | 5 | 12 | 119.0 | 5 | 12 | 32.5 | 5 | 7 | 6 | 6 | 98.8 | 176 | 188 | 6 | 7 | 58.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 12 | 10 | 12 | 6 | 8 | 6 | 8 | 67.0 | 35.0 | 39.0 | 6 | 16 | 126.0 | 6 | 16 | 40.0 | 5 | 6.5 | 6 | 6 | 92.5 | 176 | 188 | 6 | 6.5 | 57.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 13 | 10 | 12 | 5 | 6.5 | 6 | 6.5 | 62.0 | 35.0 | 35.0 | 6 | 16 | 121.0 | 6 | 16 | 37.5 | 5 | 6.5 | 6 | 6 | 89.8 | 177 | 189 | 6 | 7 | 57.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 13 | 11 | 12 | 5 | 7 | 6 | 7 | 83.8 | 31.0 | 35.0 | 6 | 15 | 61.0 | 6 | 15 | 36.0 | 5 | 6 | 6 | 6.5 | 81.4 | 177 | 189 | 6 | 6.5 | 56.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 13 | 12 | 12 | 5 | 7 | 6 | 7.5 | 73.9 | 35.0 | 35.0 | 6 | 13 | 57.5 | 6 | 13 | 35.0 | 5 | 6 | 6 | 6.5 | 76.1 | 177 | 189 | 7 | 7 | 58.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 14 | 12 | 12 | 5 | 7 | 6 | 7 | 71.4 | 36.0 | 36.0 | 6 | 13 | 56.0 | 6 | 13 | 35.0 | 6 | 8 | 6 | 6.5 | 74.1 | 178 | 190 | 7 | 7 | 58.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 15 | 13 | 12 | 5 | 6.5 | 6 | 7.5 | 68.8 | 37.0 | 37.0 | 6 | 13 | 55.0 | 6 | 13 | 34.5 | 6 | 7.5 | 6 | 6.5 | 71.6 | 179 | 191 | 7 | 7 | 57.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 14 FT | 14 | 16 | 13 | 12 | 5 | 6 | 6 | 6.5 | 67.3 | 38.0 | 38.0 | 6 | 12 | 54.5 | 6 | 12 | 34.5 | 6 | 6.5 | 6 | 6 | 70.1 | 180 | 192 | 7 | 7 | 57.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 16 FT | 15 | 18 | 14 | 12 | 6 | 8 | 6 | 6.5 | 72.1 | 39.0 | 39.0 | 6 | 12 | 60.0 | 6 | 12 | 40.5 | 6 | 7 | 6 | 6.5 | 69.5 | 182 | 194 | 6 | 6 | 54.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 18 FT | 17 | 19 | 14 | 12 | 6 | 7.5 | 6 | 6 | 72.1 | 41.0 | 41.0 | 6 | 12 | 59.5 | 6 | 12 | 40.5 | 6 | 6.5 | 6 | 6 | 68.1 | 183 | 195 | 6 | 6 | 54.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 15 | 12 | 6 | 7 | 6 | 6 | 71.5 | 42.0 | 42.0 | 6 | 12 | 59.0 | 6 | 12 | 40.0 | 6 | 6.5 | 6 | 6 | 67.1 | 184 | 196 | 7 | 7 | 57.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 22 FT | 19 | 22 | 16 | 12 | 6 | 6.5 | 6 | 6 | 71.4 | 43.0 | 43.0 | 6 | 12 | 58.5 | 6 | 12 | 40.0 | 6 | 6.5 | 6 | 6 | 67.4 | 186 | 198 | 7 | 7 | 57.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 24 FT | 20 | 23 | 16 | 12 | 6 | 6.5 | 6 | 6 | 71.3 | 44.0 | 44.0 | 6 | 12 | 58.0 | 6 | 12 | 40.0 | 6 | 6.5 | 6 | 6 | 67.1 | 187 | 199 | 7 | 7 | 57.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 26 FT | 21 | 24 | 17 | 12 | 6 | 6 | 6 | 6 | 71.4 | 45.0 | 45.0 | 6 | 12 | 57.0 | 6 | 12 | 39.5 | 6 | 6 | 6 | 6 | 67.1 | 188 | 200 | 7 | 7 | 57.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 28 FT | 22 | 25 | 17 | 12 | 6 | 6 | 6 | 6 | 69.1 | 46.0 | 46.0 | 7 | 15 | 61.5 | 7 | 15 | 44.0 | 6 | 6 | 6 | 6.5 | 64.9 | 189 | 201 | 7 | 6.5 | 57.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 30 FT | 23 | 26 | 17 | 12 | 6 | 6 | 7 | 7.5 | 74.1 | 47.0 | 47.0 | 7 | 15 | 61.0 | 7 | 15 | 43.0 | 6 | 6 | 6 | 6.5 | 64.9 | 190 | 202 | 7 | 6.5 | 57.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 32 FT | 23 | 27 | 17 | 12 | 7 | 7 | 7 | 6.5 | 74.0 | 47.0 | 47.0 | 7 | 14 | 61.0 | 7 | 14 | 44.0 | 6 | 6 | 6 | 6 | 65.0 | 191 | 203 | 7 | 6 | 57.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 34 FT | 24 | 28 | 18 | 12 | 7 | 7 | 7 | 7 | 74.5 | 48.0 | 48.0 | 7 | 14 | 60.0 | 7 | 14 | 43.0 | 6 | 6 | 6 | 6 | 65.3 | 192 | 204 | 7 | 6 | 57.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 36 FT | 25 | 29 | 19 | 12 | 7 | 7 | 7 | 7 | 75.0 | 49.0 | 49.0 | 7 | 14 | 59.0 | 7 | 14 | 42.0 | 7 | 7.5 | 6 | 6.5 | 65.5 | 193 | 205 | 8 | 7.5 | 63.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 38 FT | 26 | 30 | 20 | 12 | 7 | 7 | 7 | 7.5 | 75.5 | 50.0 | 50.0 | 7 | 13 | 58.0 | 7 | 13 | 41.5 | 7 | 7.5 | 6 | 6 | 65.9 | 194 | 206 | 8 | 7.5 | 63.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 40 FT | 27 | 31 | 20 | 12 | 7 | 7 | 7 | 6.5 | 75.6 | 51.0 | 51.0 | 7 | 13 | 57.5 | 7 | 13 | 40.5 | 7 | 7.5 | 6 | 6 | 66.0 | 195 | 207 | 8 | 7 | 63.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 42 FT | 28 | 32 | 21 | 12 | 7 | 6.5 | 7 | 7 | 76.3 | 52.0 | 52.0 | 7 | 12 | 57.0 | 7 | 12 | 39.5 | 7 | 7 | 6 | 6 | 66.4 | 196 | 208 | 8 | 7 | 63.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 44 FT | 28 | 33 | 22 | 12 | 7 | 6.5 | 7 | 7 | 76.6 | 52.0 | 58.0 | 7 | 12 | 57.0 | 7 | 12 | 40.0 | 7 | 7 | 7 | 7.5 | 69.6 | 197 | 209 | 8 | 6.5 | 63.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 46 FT | 29 | 34 | 22 | 12 | 7 | 6.5 | 7 | 6 | 76.8 | 53.0 | 59.0 | 7 | 12 | 56.5 | 7 | 12 | 39.0 | 7 | 7 | 7 | 7.5 | 69.9 | 198 | 210 | 8 | 6.5 | 63.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 48 FT | 30 | 35 | 24 | 12 | 7 | 6 | 7 | 7 | 78.0 | 54.0 | 60.0 | 7 | 12 | 56.0 | 7 | 12 | 39.0 | 7 | 7 | 7 | 7.5 | 70.4 | 199 | 211 | 8 | 6.5 | 64.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 50 FT | 30 | 36 | 24 | 12 | 7 | 6 | 7 | 6 | 78.0 | 54.0 | 60.0 | 7 | 12 | 56.0 | 7 | 12 | 39.0 | 7 | 7 | 7 | 7.5 | 70.5 | 200 | 212 | 8 | 6 | 64.0 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|---------|------|------------------|------|---------|------|------|------|---------|-------|-------|---------|------|------------------------------------|-----------|------|------|------|------|----|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 8 | 8 | 5 | 6 | 5 | 8.5 | 61.8 | 30.0 | 34.0 | 34.0 | 5 | 12 | 125.5 | 5 | 12 | 36.5 | 5 | 7 | 6 | 7 | 61.0 | 90 | 102 | 114 | 6 | 6 | 60.0 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 2 FT | 15 | 12 | 8 | 8 | 6 | 8 | 5 | 8 | 65.8 | 31.0 | 35.0 | 35.0 | 6 | 16 | 129.5 | 6 | 16 | 43.5 | 5 | 7 | 5 | 7 | 53.8 | 92 | 104 | 116 | 6 | 6.5 | 59.5 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 4 FT | 11 | 11 | 8 | 8 | 6 | 8 | 6 | 7 | 52.1 | 31.0 | 31.0 | 31.0 | 6 | 13 | 82.0 | 6 | 13 | 38.0 | 5 | 6.5 | 5 | 6 | 46.5 | 91 | 103 | 115 | 7 | 6.5 | 62.0 | 5 | 11 | 5 | 12 | 12 | | | | | |
| 6 FT | 12 | 12 | 8 | 8 | 5 | 6.5 | 5 | 6.5 | 44.1 | 32.0 | 32.0 | 32.0 | 6 | 13 | 68.0 | 6 | 13 | 36.5 | 5 | 6 | 5 | 6.5 | 42.8 | 92 | 104 | 116 | 7 | 6.5 | 61.0 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 8 FT | 12 | 13 | 8 | 8 | 5 | 6 | 5 | 6 | 41.5 | 32.0 | 32.0 | 32.0 | 7 | 16 | 65.0 | 7 | 16 | 38.5 | 5 | 6 | 5 | 6.5 | 40.0 | 93 | 105 | 117 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 12 | 0 | | | | | |
| 10 FT | 13 | 15 | 8 | 8 | 5 | 6 | 5 | 6 | 39.5 | 29.0 | 33.0 | 33.0 | 7 | 15 | 63.0 | 7 | 15 | 38.0 | 6 | 7.5 | 5 | 8 | 38.0 | 95 | 107 | 119 | 7 | 7 | 60.5 | 5 | 12 | 5 | 12 | 0 | | | | | |
| 12 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 6.5 | 42.4 | 35.0 | 35.0 | 35.0 | 7 | 16 | 70.0 | 7 | 16 | 46.0 | 6 | 7 | 5 | 7.5 | 37.1 | 96 | 108 | 120 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 11 | 0 | | | | | |
| 14 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 6 | 41.1 | 36.0 | 36.0 | 36.0 | 7 | 15 | 69.0 | 7 | 15 | 46.0 | 6 | 7 | 5 | 7 | 36.1 | 97 | 109 | 121 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 10 | 0 | | | | | |
| 16 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6 | 40.1 | 37.0 | 37.0 | 37.0 | 7 | 14 | 68.5 | 7 | 14 | 45.5 | 6 | 6 | 5 | 6.5 | 35.4 | 98 | 110 | 122 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | |
| 18 FT | 18 | 20 | 8 | 8 | 6 | 6.5 | 6 | 8 | 43.5 | 38.0 | 38.0 | 38.0 | 7 | 14 | 68.0 | 7 | 14 | 45.5 | 6 | 6.5 | 5 | 6 | 34.8 | 100 | 112 | 124 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | |
| 20 FT | 20 | 21 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 42.6 | 44.0 | 44.0 | 44.0 | 7 | 14 | 67.0 | 7 | 14 | 45.5 | 6 | 6 | 6 | 7.5 | 37.5 | 101 | 113 | 125 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 9 | 0 | | | | | |
| 22 FT | 21 | 23 | 8 | 8 | 6 | 6 | 6 | 6.5 | 42.5 | 45.0 | 45.0 | 45.0 | 7 | 14 | 66.5 | 7 | 14 | 45.0 | 6 | 6 | 6 | 6.5 | 37.3 | 103 | 115 | 127 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 8 | 0 | | | | | |
| 24 FT | 22 | 24 | 9 | 8 | 6 | 6 | 6 | 7.5 | 43.1 | 42.0 | 42.0 | 46.0 | 7 | 13 | 66.0 | 7 | 13 | 45.0 | 6 | 6 | 6 | 7 | 37.6 | 104 | 116 | 128 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | |
| 26 FT | 23 | 25 | 9 | 8 | 7 | 7.5 | 6 | 6.5 | 42.9 | 47.0 | 47.0 | 47.0 | 7 | 13 | 65.5 | 7 | 13 | 45.0 | 6 | 6 | 6 | 7 | 37.6 | 105 | 117 | 129 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | |
| 28 FT | 24 | 26 | 9 | 8 | 7 | 7.5 | 6 | 7 | 41.3 | 48.0 | 48.0 | 48.0 | 7 | 13 | 64.5 | 7 | 13 | 44.5 | 7 | 8 | 6 | 6.5 | 36.1 | 106 | 118 | 130 | 7 | 6.5 | 59.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | |
| 30 FT | 25 | 27 | 9 | 8 | 7 | 7 | 6 | 6 | 41.3 | 49.0 | 49.0 | 49.0 | 7 | 13 | 64.0 | 7 | 13 | 44.5 | 7 | 7.5 | 6 | 6.5 | 36.3 | 107 | 119 | 131 | 7 | 6 | 59.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | |
| 32 FT | 26 | 29 | 10 | 8 | 7 | 7 | 6 | 7 | 42.3 | 50.0 | 50.0 | 50.0 | 7 | 13 | 63.5 | 7 | 13 | 44.0 | 7 | 8 | 6 | 6.5 | 36.9 | 109 | 121 | 133 | 8 | 7.5 | 65.5 | 5 | 12 | 5 | 8 | 0 | | | | | |
| 34 FT | 27 | 30 | 10 | 8 | 7 | 6.5 | 6 | 6.5 | 42.3 | 51.0 | 51.0 | 51.0 | 7 | 13 | 62.5 | 7 | 13 | 43.5 | 7 | 7.5 | 6 | 6.5 | 37.0 | 110 | 122 | 134 | 8 | 7.5 | 65.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | |
| 36 FT | 28 | 31 | 11 | 8 | 7 | 6.5 | 6 | 7.5 | 43.1 | 52.0 | 52.0 | 52.0 | 7 | 12 | 62.0 | 7 | 12 | 42.5 | 7 | 7.5 | 6 | 7 | 37.5 | 111 | 123 | 135 | 8 | 7 | 65.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | |
| 38 FT | 29 | 32 | 11 | 8 | 7 | 6 | 6 | 7 | 43.1 | 53.0 | 53.0 | 53.0 | 7 | 12 | 61.0 | 7 | 12 | 41.5 | 7 | 7.5 | 6 | 6.5 | 37.6 | 112 | 124 | 136 | 8 | 7 | 65.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | |
| 40 FT | 30 | 33 | 11 | 8 | 7 | 6 | 6 | 7 | 43.1 | 54.0 | 54.0 | 54.0 | 7 | 12 | 60.0 | 7 | 12 | 41.0 | 7 | 7 | 6 | 6.5 | 37.9 | 113 | 125 | 137 | 8 | 6.5 | 65.5 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 42 FT | 31 | 34 | 12 | 8 | 7 | 6 | 6 | 7.5 | 44.0 | 55.0 | 55.0 | 55.0 | 8 | 15 | 67.0 | 8 | 15 | 48.0 | 7 | 7 | 6 | 7 | 38.4 | 114 | 126 | 138 | 8 | 6.5 | 65.5 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 44 FT | 32 | 35 | 12 | 8 | 8 | 7.5 | 6 | 7 | 44.0 | 56.0 | 56.0 | 56.0 | 8 | 14 | 66.5 | 8 | 14 | 47.0 | 7 | 7 | 6 | 6.5 | 38.5 | 115 | 127 | 139 | 8 | 6.5 | 65.5 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 46 FT | 33 | 36 | 12 | 8 | 8 | 7 | 6 | 7 | 44.0 | 57.0 | 57.0 | 57.0 | 8 | 14 | 66.0 | 8 | 14 | 46.0 | 7 | 7 | 6 | 6.5 | 38.8 | 116 | 128 | 140 | 8 | 6 | 65.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | |
| 48 FT | 33 | 37 | 12 | 8 | 8 | 6.5 | 6 | 7 | 44.0 | 57.0 | 57.0 | 57.0 | 8 | 13 | 66.0 | 8 | 13 | 46.5 | 7 | 6.5 | 6 | 6.5 | 38.8 | 117 | 129 | 141 | 8 | 6 | 65.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | |
| 50 FT | 34 | 38 | 12 | 8 | 8 | 7 | 6 | 6 | 44.0 | 58.0 | 58.0 | 58.0 | 8 | 14 | 65.0 | 8 | 14 | 46.0 | 7 | 6.5 | 6 | 6 | 39.0 | 118 | 130 | 142 | 8 | 6 | 65.5 | 5 | 12 | 5 | 6 | 0 | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|---------|------|------------------|------|---------|------|----|--------|--------|--------|---------|------|----|---------|-----------|---------|------|---------------------------------------|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 11 | 9 | 10 | 5 | 6 | 5 | 7.5 | 62.6 | 34.0 | 34.0 | 34.0 | 5 | 12 | 126.5 | 5 | 12 | 36.5 | 5 | 6.5 | 6 | 6.5 | 81.1 | 127 | 139 | 151 | 6 | 6.5 | 60.5 | 5 | 11.5 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 12 | 9 | 10 | 6 | 8 | 5 | 7.5 | 66.6 | 35.0 | 35.0 | 35.0 | 6 | 16 | 130.5 | 6 | 16 | 43.5 | 5 | 6.5 | 6 | 6.5 | 75.6 | 128 | 140 | 152 | 6 | 6.5 | 60.0 | 5 | 12 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 11 | 9 | 10 | 6 | 8 | 6 | 7 | 78.5 | 35.0 | 35.0 | 35.0 | 6 | 13 | 84.0 | 6 | 13 | 38.0 | 5 | 6.5 | 6 | 6 | 66.3 | 127 | 139 | 151 | 7 | 6.5 | 62.0 | 5 | 9 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 12 | 12 | 9 | 10 | 5 | 6.5 | 6 | 6.5 | 63.6 | 32.0 | 36.0 | 36.0 | 6 | 13 | 67.0 | 6 | 13 | 37.0 | 5 | 6 | 6 | 6 | 61.5 | 128 | 140 | 152 | 7 | 6.5 | 61.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 14 | 9 | 10 | 5 | 6 | 6 | 6.5 | 58.3 | 32.0 | 32.0 | 36.0 | 6 | 12 | 61.5 | 6 | 12 | 36.0 | 6 | 8 | 6 | 6.5 | 59.1 | 130 | 142 | 154 | 7 | 7 | 61.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 15 | 9 | 10 | 5 | 6 | 6 | 6 | 55.4 | 33.0 | 33.0 | 37.0 | 7 | 15 | 63.0 | 7 | 15 | 38.5 | 6 | 7.5 | 6 | 6.5 | 56.6 | 131 | 143 | 155 | 7 | 7 | 61.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 14 | 16 | 10 | 10 | 5 | 6 | 6 | 6.5 | 53.6 | 34.0 | 34.0 | 38.0 | 7 | 15 | 61.5 | 7 | 15 | 38.5 | 6 | 7 | 6 | 7 | 54.6 | 132 | 144 | 156 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 16 | 17 | 10 | 10 | 6 | 8 | 6 | 7 | 58.0 | 36.0 | 36.0 | 40.0 | 7 | 15 | 69.0 | 7 | 15 | 46.5 | 6 | 7 | 6 | 6.5 | 53.3 | 133 | 145 | 157 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 17 | 19 | 11 | 10 | 6 | 7.5 | 6 | 7 | 57.5 | 37.0 | 37.0 | 41.0 | 7 | 15 | 68.5 | 7 | 15 | 46.0 | 6 | 6.5 | 6 | 8 | 52.4 | 135 | 147 | 159 | 7 | 7 | 60.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 18 | 20 | 12 | 10 | 6 | 7 | 6 | 7.5 | 57.4 | 38.0 | 38.0 | 38.0 | 7 | 14 | 68.0 | 7 | 14 | 46.0 | 6 | 6.5 | 5 | 6 | 48.8 | 136 | 148 | 160 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 19 | 21 | 12 | 10 | 6 | 6.5 | 6 | 7 | 56.6 | 39.0 | 39.0 | 43.0 | 7 | 14 | 67.5 | 7 | 14 | 46.0 | 6 | 6 | 6 | 8 | 51.1 | 137 | 149 | 161 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 21 | 23 | 12 | 10 | 6 | 6 | 6 | 6.5 | 56.1 | 41.0 | 41.0 | 45.0 | 7 | 14 | 66.5 | 7 | 14 | 45.5 | 6 | 6 | 6 | 7.5 | 51.0 | 139 | 151 | 163 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 22 | 24 | 13 | 10 | 6 | 6 | 6 | 7 | 56.5 | 42.0 | 42.0 | 46.0 | 7 | 14 | 66.0 | 7 | 14 | 45.5 | 6 | 6 | 6 | 8 | 51.1 | 140 | 152 | 164 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 23 | 25 | 13 | 10 | 7 | 7.5 | 6 | 6.5 | 56.3 | 43.0 | 43.0 | 47.0 | 7 | 14 | 65.5 | 7 | 14 | 45.5 | 7 | 7.5 | 6 | 7.5 | 51.0 | 141 | 153 | 165 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 24 | 26 | 13 | 10 | 7 | 7.5 | 6 | 6.5 | 54.4 | 44.0 | 44.0 | 48.0 | 7 | 14 | 64.5 | 7 | 14 | 45.0 | 7 | 7.5 | 6 | 8 | 49.1 | 142 | 154 | 166 | 7 | 6.5 | 60.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 25 | 28 | 13 | 10 | 7 | 7 | 6 | 6 | 54.4 | 45.0 | 45.0 | 49.0 | 7 | 14 | 64.0 | 7 | 14 | 45.0 | 7 | 8 | 6 | 8 | 49.3 | 144 | 156 | 168 | 7 | 6 | 60.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 26 | 29 | 14 | 10 | 7 | 7 | 6 | 6.5 | 55.1 | 46.0 | 50.0 | 50.0 | 7 | 13 | 63.5 | 7 | 13 | 44.0 | 7 | 7.5 | 6 | 8.5 | 49.8 | 145 | 157 | 169 | 8 | 7.5 | 66.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 27 | 30 | 14 | 10 | 7 | 6.5 | 6 | 6 | 55.0 | 47.0 | 51.0 | 51.0 | 7 | 13 | 62.5 | 7 | 13 | 43.0 | 7 | 7.5 | 6 | 8 | 49.8 | 146 | 158 | 170 | 8 | 7.5 | 66.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 28 | 31 | 15 | 10 | 7 | 6.5 | 6 | 6.5 | 55.8 | 52.0 | 52.0 | 52.0 | 7 | 12 | 61.5 | 7 | 12 | 42.5 | 7 | 7 | 6 | 7.5 | 50.3 | 147 | 159 | 171 | 8 | 7 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 29 | 32 | 15 | 10 | 7 | 6 | 6 | 6 | 55.6 | 53.0 | 53.0 | 53.0 | 7 | 12 | 60.5 | 7 | 12 | 41.5 | 7 | 7 | 6 | 7.5 | 50.4 | 148 | 160 | 172 | 8 | 7 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 30 | 33 | 16 | 10 | 7 | 6 | 6 | 6 | 56.4 | 54.0 | 54.0 | 54.0 | 7 | 12 | 59.5 | 7 | 12 | 41.0 | 7 | 6.5 | 6 | 7 | 50.8 | 149 | 161 | 173 | 8 | 6.5 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 31 | 35 | 16 | 10 | 7 | 6 | 6 | 6 | 56.5 | 55.0 | 55.0 | 55.0 | 8 | 15 | 67.0 | 8 | 15 | 48.0 | 7 | 7 | 6 | 6.5 | 51.0 | 151 | 163 | 175 | 8 | 6.5 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 31 | 35 | 16 | 10 | 8 | 7 | 7 | 7.5 | 61.4 | 55.0 | 55.0 | 55.0 | 8 | 14 | 67.0 | 8 | 14 | 48.5 | 7 | 6 | 6 | 6.5 | 50.9 | 151 | 163 | 175 | 8 | 6.5 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 32 | 36 | 17 | 10 | 8 | 7.5 | 6 | 6 | 57.1 | 56.0 | 56.0 | 56.0 | 8 | 14 | 66.5 | 8 | 14 | 47.5 | 7 | 6 | 6 | 6.5 | 51.4 | 152 | 164 | 176 | 8 | 6 | 66.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 33 | 37 | 17 | 10 | 8 | 7 | 7 | 7.5 | 62.1 | 57.0 | 57.0 | 57.0 | 8 | 14 | 66.0 | 8 | 14 | 47.0 | 7 | 6 | 6 | 6.5 | 51.5 | 153 | 165 | 177 | 8 | 6 | 66.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 34 | 38 | 17 | 10 | 8 | 7 | 7 | 7 | 62.1 | 58.0 | 58.0 | 58.0 | 8 | 14 | 65.5 | 8 | 14 | 46.5 | 7 | 6 | 6 | 6 | 51.8 | 154 | 166 | 178 | 8 | 6 | 66.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 13 FT OR 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|------------------------|------|------|---------|-------|-------|---------|------------------|---------|------|------|---------|------|------------------------|---------|------|------------------------------|------|------|-----------|------|------|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 HT=13' HT=14' | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 HT=13' HT=14' | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | |
| | 1 FT | 14 | 11 | 11 | 11 | 5 | 6 | 5 | 7 | 64.1 | 34.0 | 34.0 | 5 | 12 | 127.5 | 5 | 12 | 36.5 | 5 | 6.5 | 5 | 6 | 85.3 | 163 | 175 | 6 | 6 | 60.5 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 12 | 11 | 11 | 6 | 8 | 5 | 7 | 68.1 | 35.0 | 35.0 | 6 | 16 | 131.5 | 6 | 16 | 43.5 | 5 | 6.5 | 5 | 6 | 80.9 | 164 | 176 | 6 | 6.5 | 60.0 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 12 | 11 | 11 | 5 | 6 | 5 | 6 | 92.9 | 31.0 | 31.0 | 6 | 13 | 82.5 | 6 | 13 | 38.0 | 5 | 6 | 5 | 6 | 75.5 | 164 | 176 | 7 | 7 | 62.5 | 5 | 11.5 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 12 | 11 | 11 | 5 | 6 | 6 | 7.5 | 74.6 | 31.0 | 35.0 | 6 | 12 | 64.5 | 6 | 12 | 37.0 | 5 | 6 | 6 | 6.5 | 72.1 | 164 | 176 | 7 | 6.5 | 61.5 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 14 | 11 | 11 | 5 | 6.5 | 6 | 7.5 | 68.5 | 32.0 | 36.0 | 6 | 12 | 61.5 | 6 | 12 | 36.5 | 6 | 8 | 6 | 7 | 70.1 | 166 | 178 | 7 | 7 | 61.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 15 | 11 | 11 | 5 | 6.5 | 6 | 7 | 65.9 | 37.0 | 37.0 | 6 | 12 | 59.5 | 6 | 12 | 36.0 | 6 | 7.5 | 6 | 6.5 | 67.4 | 167 | 179 | 7 | 6.5 | 61.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 12 FT | 14 | 16 | 12 | 11 | 5 | 6 | 6 | 7 | 64.0 | 38.0 | 38.0 | 7 | 15 | 61.5 | 7 | 15 | 38.5 | 6 | 7 | 6 | 7 | 65.5 | 168 | 180 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 14 FT | 15 | 17 | 12 | 11 | 6 | 7.5 | 6 | 6.5 | 68.5 | 39.0 | 39.0 | 7 | 15 | 69.0 | 7 | 15 | 46.5 | 6 | 6.5 | 6 | 6 | 64.1 | 169 | 181 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 16 FT | 17 | 19 | 13 | 11 | 6 | 7.5 | 6 | 6.5 | 68.0 | 41.0 | 41.0 | 7 | 15 | 68.0 | 7 | 15 | 46.5 | 6 | 6.5 | 6 | 7 | 63.4 | 171 | 183 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 18 FT | 18 | 20 | 13 | 11 | 6 | 7 | 6 | 6 | 66.9 | 42.0 | 42.0 | 7 | 15 | 67.5 | 7 | 15 | 46.5 | 6 | 6 | 6 | 6 | 62.4 | 172 | 184 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 20 FT | 19 | 22 | 14 | 11 | 6 | 6.5 | 6 | 6 | 66.5 | 43.0 | 43.0 | 7 | 14 | 67.0 | 7 | 14 | 46.0 | 6 | 6 | 6 | 7 | 62.0 | 174 | 186 | 7 | 7 | 60.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 22 FT | 20 | 23 | 14 | 11 | 6 | 6 | 7 | 8 | 70.6 | 44.0 | 44.0 | 7 | 14 | 66.5 | 7 | 14 | 46.0 | 6 | 6 | 6 | 6 | 61.3 | 175 | 187 | 7 | 6.5 | 60.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 24 FT | 22 | 25 | 15 | 11 | 6 | 6 | 6 | 6 | 66.1 | 46.0 | 46.0 | 7 | 15 | 65.5 | 7 | 15 | 45.5 | 6 | 6 | 6 | 7 | 61.5 | 177 | 189 | 7 | 6.5 | 60.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 26 FT | 23 | 25 | 15 | 11 | 7 | 7.5 | 7 | 7.5 | 70.6 | 47.0 | 47.0 | 7 | 14 | 65.0 | 7 | 14 | 45.5 | 7 | 7 | 6 | 6 | 60.9 | 177 | 189 | 7 | 6.5 | 60.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 28 FT | 24 | 27 | 16 | 11 | 7 | 7.5 | 7 | 8 | 71.0 | 48.0 | 48.0 | 7 | 14 | 64.5 | 7 | 14 | 45.0 | 7 | 8 | 6 | 7 | 61.3 | 179 | 191 | 7 | 6 | 60.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 30 FT | 25 | 28 | 16 | 11 | 7 | 7 | 7 | 8 | 68.5 | 49.0 | 49.0 | 7 | 14 | 63.5 | 7 | 14 | 44.0 | 7 | 7.5 | 6 | 7 | 58.9 | 180 | 192 | 7 | 6 | 60.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 32 FT | 26 | 29 | 16 | 11 | 7 | 7 | 7 | 7.5 | 68.4 | 50.0 | 50.0 | 7 | 13 | 62.5 | 7 | 13 | 43.5 | 7 | 7.5 | 6 | 6.5 | 58.9 | 181 | 193 | 8 | 7.5 | 66.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 34 FT | 27 | 30 | 17 | 11 | 7 | 6.5 | 7 | 7.5 | 69.0 | 51.0 | 51.0 | 7 | 13 | 61.5 | 7 | 13 | 42.5 | 7 | 7.5 | 6 | 7 | 59.1 | 182 | 194 | 8 | 7.5 | 66.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 36 FT | 27 | 31 | 17 | 11 | 7 | 6 | 7 | 6.5 | 68.9 | 51.0 | 51.0 | 7 | 12 | 61.5 | 7 | 12 | 43.5 | 7 | 7 | 6 | 7 | 59.1 | 183 | 195 | 8 | 7 | 66.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 38 FT | 28 | 33 | 18 | 11 | 7 | 6 | 7 | 7 | 69.8 | 52.0 | 52.0 | 7 | 12 | 60.0 | 7 | 12 | 42.5 | 7 | 7 | 6 | 6.5 | 59.6 | 185 | 197 | 8 | 6.5 | 66.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 40 FT | 29 | 34 | 19 | 11 | 7 | 6 | 7 | 7 | 70.4 | 53.0 | 53.0 | 7 | 12 | 59.5 | 7 | 12 | 41.5 | 7 | 7 | 6 | 6.5 | 60.0 | 186 | 198 | 8 | 6.5 | 66.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 42 FT | 30 | 35 | 19 | 11 | 7 | 6 | 7 | 6.5 | 70.4 | 54.0 | 54.0 | 7 | 12 | 59.0 | 7 | 12 | 40.5 | 7 | 7 | 6 | 6.5 | 60.1 | 187 | 199 | 8 | 6.5 | 66.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 44 FT | 31 | 36 | 20 | 11 | 7 | 6 | 7 | 7 | 71.0 | 55.0 | 55.0 | 8 | 15 | 66.5 | 8 | 15 | 47.5 | 7 | 7 | 6 | 6 | 60.5 | 188 | 200 | 8 | 6 | 66.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 46 FT | 32 | 37 | 21 | 11 | 8 | 7.5 | 7 | 7 | 71.8 | 56.0 | 56.0 | 8 | 15 | 66.0 | 8 | 15 | 47.0 | 7 | 6.5 | 6 | 6 | 60.8 | 189 | 201 | 8 | 6 | 66.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 48 FT | 32 | 38 | 21 | 11 | 8 | 7 | 7 | 6 | 71.8 | 56.0 | 56.0 | 8 | 14 | 66.0 | 8 | 14 | 47.0 | 7 | 6.5 | 6 | 6 | 60.9 | 190 | 202 | 8 | 6 | 66.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 50 FT | 33 | 39 | 22 | 11 | 8 | 7 | 7 | 6.5 | 72.5 | 57.0 | 57.0 | 8 | 15 | 65.5 | 8 | 15 | 47.0 | 7 | 6.5 | 6 | 6 | 61.3 | 191 | 203 | 8 | 6 | 66.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 15 FT OR 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|-------|------------------------|---------|------|------|-------|---------|------|------------------|------|---------|------|---------|------|------------------------|-----|---------|------------------------------|------|---------|-----------|---------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 HT=15' HT=16' | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 HT=15' HT=16' | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 12 | 12 | 13 | 5 | 6 | 5 | 6 | 65.0 | 34.0 | 34.0 | 5 | 12 | 128.5 | 5 | 12 | 36.0 | 5 | 6.5 | 6 | 7 | 99.8 | 188 | 200 | 6 | 6.5 | 61.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 13 | 12 | 13 | 6 | 8 | 6 | 8.5 | 72.0 | 35.0 | 39.0 | 6 | 16 | 135.5 | 6 | 16 | 43.5 | 5 | 6.5 | 6 | 7 | 96.4 | 189 | 201 | 6 | 6.5 | 60.5 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 13 | 12 | 13 | 5 | 6 | 6 | 7 | 115.0 | 35.0 | 35.0 | 6 | 14 | 81.0 | 6 | 14 | 38.5 | 5 | 6 | 6 | 6.5 | 91.6 | 189 | 201 | 6 | 6 | 60.5 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 13 | 12 | 13 | 5 | 6.5 | 6 | 6.5 | 84.8 | 35.0 | 35.0 | 6 | 13 | 63.5 | 6 | 13 | 37.5 | 5 | 6 | 6 | 6 | 84.8 | 189 | 201 | 7 | 7 | 62.0 | 5 | 12 | 5 | 6.5 | 12 | | | | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 14 | 13 | 13 | 5 | 6.5 | 6 | 7 | 78.8 | 36.0 | 36.0 | 6 | 13 | 61.0 | 6 | 13 | 37.0 | 6 | 8 | 6 | 6.5 | 80.6 | 190 | 202 | 7 | 7 | 61.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 15 | 13 | 13 | 5 | 6.5 | 6 | 7 | 75.9 | 37.0 | 37.0 | 6 | 12 | 59.5 | 6 | 12 | 36.5 | 6 | 7.5 | 6 | 6.5 | 78.4 | 191 | 203 | 7 | 6.5 | 61.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 12 FT | 14 | 16 | 14 | 13 | 5 | 6 | 6 | 7 | 72.9 | 38.0 | 38.0 | 6 | 12 | 58.5 | 6 | 12 | 36.5 | 6 | 6.5 | 6 | 6.5 | 75.6 | 192 | 204 | 7 | 6.5 | 61.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 14 FT | 15 | 18 | 14 | 13 | 6 | 8 | 6 | 6 | 77.1 | 39.0 | 39.0 | 7 | 16 | 69.0 | 7 | 16 | 47.0 | 6 | 6.5 | 6 | 6 | 75.3 | 194 | 206 | 7 | 7 | 61.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 16 FT | 16 | 19 | 15 | 13 | 6 | 7.5 | 6 | 6 | 76.0 | 40.0 | 40.0 | 7 | 15 | 68.0 | 7 | 15 | 47.0 | 6 | 6.5 | 6 | 6 | 73.3 | 195 | 207 | 7 | 6.5 | 61.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 18 FT | 18 | 20 | 16 | 13 | 6 | 7 | 6 | 6 | 76.0 | 42.0 | 42.0 | 7 | 15 | 67.5 | 7 | 15 | 47.0 | 6 | 6 | 6 | 6 | 71.6 | 196 | 208 | 7 | 6.5 | 61.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 20 FT | 19 | 22 | 16 | 13 | 6 | 6.5 | 7 | 8 | 80.4 | 43.0 | 49.0 | 7 | 15 | 67.5 | 7 | 15 | 47.0 | 6 | 6 | 7 | 7.5 | 74.5 | 198 | 210 | 7 | 7 | 61.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 22 FT | 20 | 23 | 17 | 13 | 6 | 6.5 | 7 | 8 | 79.9 | 44.0 | 50.0 | 7 | 14 | 67.0 | 7 | 14 | 46.5 | 6 | 6 | 7 | 7.5 | 73.9 | 199 | 211 | 7 | 6.5 | 61.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 24 FT | 21 | 24 | 17 | 13 | 6 | 6 | 7 | 7.5 | 79.6 | 45.0 | 51.0 | 7 | 14 | 66.5 | 7 | 14 | 46.5 | 7 | 7 | 7 | 7 | 73.6 | 200 | 212 | 7 | 6.5 | 61.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 26 FT | 23 | 26 | 18 | 13 | 7 | 7.5 | 7 | 7.5 | 80.1 | 47.0 | 53.0 | 7 | 15 | 65.5 | 7 | 15 | 46.0 | 7 | 8 | 7 | 8 | 73.9 | 202 | 214 | 7 | 6.5 | 61.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 28 FT | 23 | 27 | 19 | 13 | 7 | 7.5 | 7 | 7.5 | 80.0 | 47.0 | 47.0 | 7 | 14 | 65.0 | 7 | 14 | 46.0 | 7 | 7.5 | 6 | 6 | 70.9 | 203 | 215 | 7 | 6 | 61.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 30 FT | 24 | 28 | 19 | 13 | 7 | 7.5 | 7 | 7.5 | 77.8 | 48.0 | 48.0 | 7 | 14 | 64.5 | 7 | 14 | 46.0 | 7 | 7.5 | 6 | 6 | 68.5 | 204 | 216 | 7 | 6 | 61.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 32 FT | 25 | 29 | 19 | 13 | 7 | 7 | 7 | 7 | 77.8 | 49.0 | 49.0 | 7 | 14 | 63.5 | 7 | 14 | 45.5 | 7 | 7.5 | 6 | 6 | 68.6 | 205 | 217 | 8 | 7.5 | 67.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 34 FT | 26 | 30 | 20 | 13 | 7 | 7 | 7 | 7 | 78.3 | 50.0 | 50.0 | 7 | 13 | 63.0 | 7 | 13 | 44.5 | 7 | 6.5 | 6 | 6 | 68.9 | 206 | 218 | 8 | 7.5 | 67.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 36 FT | 27 | 32 | 21 | 13 | 7 | 6.5 | 7 | 7 | 78.9 | 51.0 | 51.0 | 7 | 13 | 62.0 | 7 | 13 | 43.5 | 7 | 7 | 6 | 6 | 69.4 | 208 | 220 | 8 | 7 | 67.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 38 FT | 28 | 33 | 22 | 13 | 7 | 6.5 | 7 | 7 | 79.4 | 52.0 | 58.0 | 7 | 12 | 61.0 | 7 | 12 | 43.0 | 7 | 7 | 7 | 7.5 | 72.6 | 209 | 221 | 8 | 6.5 | 67.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 40 FT | 29 | 34 | 22 | 13 | 7 | 6.5 | 7 | 6.5 | 79.5 | 59.0 | 59.0 | 7 | 12 | 60.0 | 7 | 12 | 42.0 | 7 | 7 | 7 | 7.5 | 72.9 | 210 | 222 | 8 | 6.5 | 67.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | |
| 42 FT | 30 | 35 | 23 | 13 | 7 | 6 | 7 | 6.5 | 80.1 | 60.0 | 60.0 | 7 | 12 | 60.0 | 7 | 12 | 41.0 | 7 | 7 | 7 | 7.5 | 73.1 | 211 | 223 | 8 | 6.5 | 67.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 44 FT | 31 | 36 | 24 | 13 | 7 | 6 | 7 | 6.5 | 80.8 | 55.0 | 61.0 | 8 | 15 | 67.5 | 8 | 15 | 48.5 | 7 | 6.5 | 7 | 7 | 73.5 | 212 | 224 | 8 | 6 | 67.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 46 FT | 32 | 37 | 24 | 13 | 7 | 6 | 7 | 6 | 80.8 | 56.0 | 62.0 | 8 | 15 | 67.0 | 8 | 15 | 48.0 | 7 | 6.5 | 7 | 7 | 73.6 | 213 | 225 | 8 | 6 | 67.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 48 FT | 32 | 38 | 26 | 13 | 8 | 7.5 | 7 | 6 | 81.9 | 56.0 | 62.0 | 8 | 14 | 67.0 | 8 | 14 | 48.0 | 7 | 6.5 | 7 | 7.5 | 74.1 | 214 | 226 | 8 | 6 | 67.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 50 FT | 33 | 39 | 27 | 13 | 8 | 7 | 7 | 6 | 82.6 | 57.0 | 63.0 | 8 | 15 | 66.0 | 8 | 15 | 47.5 | 7 | 6.5 | 7 | 7.5 | 74.5 | 215 | 227 | 8 | 6 | 67.0 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|-------|---------|------------------|------|---------|------|---------|------|------|-------|-------|-------|---------|------------------------------------|-----------|---------|------|---------|------|----|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 11 | 8 | 8 | 6 | 8 | 5 | 8 | 69.3 | 31.0 | 35.0 | 35.0 | 6 | 16 | 137.5 | 6 | 16 | 46.5 | 5 | 6.5 | 5 | 6 | 57.8 | 91 | 103 | 115 | 6 | 6 | 63.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 2 FT | 15 | 12 | 8 | 8 | 6 | 8 | 5 | 8 | 69.3 | 35.0 | 35.0 | 35.0 | 6 | 16 | 137.5 | 6 | 16 | 48.0 | 5 | 6 | 5 | 6.5 | 52.5 | 92 | 104 | 116 | 6 | 6 | 62.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 4 FT | 12 | 11 | 8 | 8 | 6 | 7.5 | 5 | 6 | 48.0 | 32.0 | 32.0 | 32.0 | 6 | 12 | 86.0 | 6 | 12 | 39.5 | 5 | 6.5 | 6 | 7 | 49.3 | 91 | 103 | 115 | 7 | 6 | 64.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 6 FT | 12 | 13 | 8 | 8 | 6 | 8 | 6 | 7.5 | 47.6 | 32.0 | 32.0 | 32.0 | 7 | 15 | 74.0 | 7 | 15 | 41.0 | 5 | 6 | 5 | 7 | 41.9 | 93 | 105 | 117 | 7 | 6.5 | 64.5 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | |
| 8 FT | 13 | 14 | 8 | 8 | 5 | 6 | 5 | 6.5 | 41.1 | 33.0 | 33.0 | 33.0 | 7 | 15 | 68.5 | 7 | 15 | 40.0 | 6 | 8 | 5 | 7.5 | 39.1 | 94 | 106 | 118 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 10 FT | 14 | 15 | 8 | 8 | 6 | 8 | 5 | 6.5 | 38.6 | 34.0 | 34.0 | 34.0 | 7 | 14 | 66.5 | 7 | 14 | 39.5 | 6 | 7.5 | 5 | 7.5 | 37.4 | 95 | 107 | 119 | 7 | 6 | 63.5 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | |
| 12 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 6.5 | 41.5 | 36.0 | 36.0 | 36.0 | 7 | 14 | 73.0 | 7 | 14 | 47.5 | 6 | 7 | 5 | 7 | 36.1 | 97 | 109 | 121 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | |
| 14 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6 | 40.3 | 37.0 | 37.0 | 37.0 | 7 | 14 | 72.5 | 7 | 14 | 47.0 | 6 | 6.5 | 5 | 6.5 | 35.1 | 98 | 110 | 122 | 7 | 6.5 | 63.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | |
| 16 FT | 18 | 20 | 8 | 8 | 6 | 7 | 6 | 8 | 43.4 | 38.0 | 38.0 | 38.0 | 7 | 13 | 71.5 | 7 | 13 | 47.0 | 6 | 6 | 5 | 6 | 34.4 | 100 | 112 | 124 | 7 | 6.5 | 63.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 18 FT | 20 | 21 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 42.4 | 44.0 | 44.0 | 44.0 | 7 | 13 | 71.0 | 7 | 13 | 46.5 | 6 | 6 | 6 | 7.5 | 37.0 | 101 | 113 | 125 | 7 | 6.5 | 63.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | |
| 20 FT | 21 | 22 | 8 | 8 | 6 | 6 | 6 | 7 | 41.8 | 45.0 | 45.0 | 45.0 | 7 | 13 | 70.5 | 7 | 13 | 46.5 | 7 | 7.5 | 6 | 7 | 36.5 | 102 | 114 | 126 | 7 | 6 | 63.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | |
| 22 FT | 23 | 24 | 8 | 8 | 7 | 7.5 | 6 | 6 | 41.3 | 47.0 | 47.0 | 47.0 | 7 | 13 | 69.5 | 7 | 13 | 46.5 | 7 | 7.5 | 6 | 6 | 36.4 | 104 | 116 | 128 | 7 | 6 | 63.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 24 FT | 24 | 26 | 9 | 8 | 7 | 7.5 | 6 | 7 | 42.1 | 48.0 | 48.0 | 48.0 | 7 | 13 | 69.0 | 7 | 13 | 46.0 | 7 | 7.5 | 6 | 6.5 | 36.8 | 106 | 118 | 130 | 7 | 6.5 | 63.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | |
| 26 FT | 25 | 27 | 9 | 8 | 7 | 7 | 6 | 6.5 | 41.9 | 49.0 | 49.0 | 49.0 | 7 | 12 | 68.5 | 7 | 12 | 46.0 | 7 | 7.5 | 6 | 6.5 | 36.6 | 107 | 119 | 131 | 7 | 6 | 63.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 28 FT | 26 | 28 | 9 | 8 | 7 | 7 | 6 | 6 | 41.8 | 50.0 | 50.0 | 50.0 | 7 | 12 | 68.0 | 7 | 12 | 46.0 | 7 | 7.5 | 6 | 6 | 36.6 | 108 | 120 | 132 | 7 | 6 | 63.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 30 FT | 27 | 29 | 9 | 8 | 7 | 6.5 | 6 | 6 | 41.1 | 51.0 | 51.0 | 51.0 | 7 | 12 | 67.0 | 7 | 12 | 45.5 | 7 | 7 | 6 | 6 | 35.4 | 109 | 121 | 133 | 8 | 7.5 | 68.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 32 FT | 28 | 31 | 10 | 8 | 7 | 6.5 | 6 | 6.5 | 41.8 | 52.0 | 52.0 | 52.0 | 7 | 12 | 66.0 | 7 | 12 | 45.0 | 7 | 7 | 6 | 6 | 35.9 | 111 | 123 | 135 | 8 | 7 | 68.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | |
| 34 FT | 29 | 32 | 10 | 8 | 7 | 6 | 6 | 6.5 | 41.8 | 53.0 | 53.0 | 53.0 | 7 | 12 | 65.5 | 7 | 12 | 44.5 | 7 | 7 | 6 | 6 | 36.0 | 112 | 124 | 136 | 8 | 7 | 68.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 36 FT | 31 | 33 | 10 | 8 | 7 | 6 | 6 | 6 | 41.8 | 55.0 | 55.0 | 55.0 | 8 | 15 | 71.5 | 8 | 15 | 50.5 | 7 | 7 | 7 | 6.5 | 39.4 | 113 | 125 | 137 | 8 | 6.5 | 68.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | |
| 38 FT | 31 | 34 | 11 | 8 | 8 | 7 | 6 | 6.5 | 42.3 | 55.0 | 55.0 | 55.0 | 8 | 14 | 71.5 | 8 | 14 | 51.0 | 7 | 6.5 | 6 | 6 | 36.8 | 114 | 126 | 138 | 8 | 6.5 | 68.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | |
| 40 FT | 33 | 35 | 11 | 8 | 8 | 7.5 | 6 | 6 | 42.3 | 57.0 | 57.0 | 57.0 | 8 | 14 | 69.5 | 8 | 14 | 49.0 | 7 | 6 | 6 | 6 | 37.0 | 115 | 127 | 139 | 8 | 6.5 | 68.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | |
| 42 FT | 33 | 37 | 11 | 8 | 8 | 7 | 6 | 6 | 42.3 | 57.0 | 57.0 | 57.0 | 8 | 14 | 69.5 | 8 | 14 | 49.5 | 7 | 6.5 | 7 | 6.5 | 40.1 | 117 | 129 | 141 | 8 | 6 | 68.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | |
| 44 FT | 34 | 38 | 12 | 8 | 8 | 7 | 6 | 6.5 | 43.3 | 58.0 | 58.0 | 58.0 | 8 | 14 | 69.0 | 8 | 14 | 48.5 | 7 | 6.5 | 6 | 6 | 37.6 | 118 | 130 | 142 | 8 | 6 | 68.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | |
| 46 FT | 35 | 39 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 43.1 | 59.0 | 59.0 | 59.0 | 8 | 13 | 68.5 | 8 | 13 | 47.5 | 7 | 6.5 | 6 | 6 | 37.9 | 119 | 131 | 143 | 8 | 6 | 68.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | |
| 48 FT | 36 | 40 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 43.1 | 60.0 | 60.0 | 60.0 | 8 | 13 | 67.5 | 8 | 13 | 46.5 | 7 | 6.5 | 6 | 6 | 38.1 | 120 | 132 | 144 | 9 | 7 | 74.5 | 5 | 11.5 | 5 | 6 | 0 | | | | | | | | | | | |
| 50 FT | 37 | 41 | 12 | 8 | 8 | 6.5 | 6 | 6 | 43.3 | 61.0 | 61.0 | 61.0 | 8 | 13 | 67.0 | 8 | 13 | 46.5 | 7 | 6 | 7 | 6.5 | 41.3 | 121 | 133 | 145 | 9 | 7 | 74.5 | 5 | 8.5 | 6 | 8 | 0 | | | | | | | | | | | |

| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|--------|---------|--------|------|---------|-------|------|------------------|------|---------|------|------|------|---------|--------|--------|---------|------|---------|-----------|------|------|---------------------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 12 | 8 | 10 | 6 | 8 | 5 | 7 | 69.6 | 35.0 | 35.0 | 35.0 | 6 | 16 | 138.5 | 6 | 16 | 47.0 | 5 | 6.5 | 6 | 6 | 83.9 | 128 | 140 | 152 | 6 | 6.5 | 63.5 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 15 | 13 | 8 | 10 | 6 | 8 | 5 | 6.5 | 69.6 | 35.0 | 35.0 | 35.0 | 6 | 16 | 138.5 | 6 | 16 | 48.0 | 5 | 6 | 6 | 6 | 77.4 | 129 | 141 | 153 | 6 | 6.5 | 63.0 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 12 | 12 | 10 | 10 | 6 | 8 | 5 | 6 | 70.1 | 32.0 | 32.0 | 32.0 | 6 | 13 | 85.5 | 6 | 13 | 40.0 | 5 | 6 | 6 | 7 | 65.5 | 128 | 140 | 152 | 7 | 6.5 | 65.5 | 5 | 10 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 12 | 13 | 10 | 10 | 6 | 8.5 | 5 | 6 | 58.6 | 32.0 | 32.0 | 32.0 | 6 | 12 | 69.0 | 6 | 12 | 38.0 | 5 | 6 | 6 | 7 | 60.8 | 129 | 141 | 153 | 7 | 6.5 | 64.5 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 13 | 14 | 10 | 10 | 5 | 6 | 6 | 7 | 57.1 | 33.0 | 33.0 | 37.0 | 7 | 15 | 68.0 | 7 | 15 | 40.5 | 6 | 8 | 6 | 7 | 57.4 | 130 | 142 | 154 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 14 | 16 | 10 | 10 | 5 | 6 | 6 | 7 | 54.4 | 34.0 | 34.0 | 34.0 | 7 | 15 | 66.5 | 7 | 15 | 40.0 | 6 | 7 | 5 | 6 | 52.0 | 132 | 144 | 156 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 15 | 17 | 10 | 10 | 6 | 8 | 6 | 7 | 58.6 | 35.0 | 35.0 | 39.0 | 7 | 14 | 73.0 | 7 | 14 | 48.0 | 6 | 7 | 6 | 7.5 | 53.1 | 133 | 145 | 157 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 17 | 18 | 10 | 10 | 6 | 7.5 | 6 | 7 | 57.1 | 37.0 | 37.0 | 41.0 | 7 | 14 | 72.5 | 7 | 14 | 47.5 | 6 | 6.5 | 6 | 6.5 | 52.0 | 134 | 146 | 158 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 18 | 20 | 11 | 10 | 6 | 7 | 6 | 7 | 57.0 | 38.0 | 38.0 | 42.0 | 7 | 14 | 71.5 | 7 | 14 | 47.5 | 6 | 6 | 6 | 8 | 51.5 | 136 | 148 | 160 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 19 | 21 | 12 | 10 | 6 | 6.5 | 6 | 7 | 56.9 | 39.0 | 39.0 | 43.0 | 7 | 13 | 71.0 | 7 | 13 | 47.5 | 6 | 6 | 6 | 8.5 | 51.1 | 137 | 149 | 161 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 21 | 23 | 12 | 10 | 6 | 6 | 6 | 7 | 56.1 | 41.0 | 41.0 | 45.0 | 7 | 13 | 70.5 | 7 | 13 | 47.0 | 7 | 8 | 6 | 8 | 50.8 | 139 | 151 | 163 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 22 | 24 | 12 | 10 | 6 | 6 | 6 | 6.5 | 55.5 | 42.0 | 42.0 | 46.0 | 7 | 13 | 70.0 | 7 | 13 | 47.0 | 7 | 7.5 | 6 | 7.5 | 50.1 | 140 | 152 | 164 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 23 | 26 | 13 | 10 | 7 | 7 | 6 | 6.5 | 55.9 | 43.0 | 43.0 | 47.0 | 7 | 12 | 69.5 | 7 | 12 | 47.0 | 7 | 7.5 | 6 | 8.5 | 50.3 | 142 | 154 | 166 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 25 | 27 | 13 | 10 | 7 | 7 | 6 | 6.5 | 55.5 | 45.0 | 45.0 | 49.0 | 7 | 13 | 68.5 | 7 | 13 | 46.5 | 7 | 7.5 | 6 | 8 | 50.3 | 143 | 155 | 167 | 7 | 6 | 63.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 26 | 29 | 14 | 10 | 7 | 7 | 6 | 6.5 | 56.3 | 46.0 | 50.0 | 50.0 | 7 | 13 | 67.5 | 7 | 13 | 46.5 | 7 | 7.5 | 6 | 8.5 | 50.5 | 145 | 157 | 169 | 8 | 7.5 | 69.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 27 | 30 | 14 | 10 | 7 | 6.5 | 6 | 6.5 | 56.0 | 47.0 | 51.0 | 51.0 | 7 | 13 | 67.0 | 7 | 13 | 46.0 | 7 | 7 | 6 | 8 | 50.5 | 146 | 158 | 170 | 8 | 7.5 | 69.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 28 | 31 | 14 | 10 | 7 | 6.5 | 6 | 6.5 | 54.3 | 52.0 | 52.0 | 52.0 | 7 | 12 | 66.0 | 7 | 12 | 45.5 | 7 | 7 | 6 | 7.5 | 48.9 | 147 | 159 | 171 | 8 | 7 | 69.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 29 | 32 | 14 | 10 | 7 | 6 | 6 | 6 | 54.1 | 53.0 | 53.0 | 53.0 | 7 | 12 | 65.0 | 7 | 12 | 44.5 | 7 | 7 | 6 | 7.5 | 48.9 | 148 | 160 | 172 | 8 | 7 | 69.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 30 | 33 | 15 | 10 | 7 | 6 | 6 | 6.5 | 54.9 | 54.0 | 54.0 | 54.0 | 7 | 12 | 64.0 | 7 | 12 | 44.0 | 7 | 6 | 6 | 7 | 49.4 | 149 | 161 | 173 | 8 | 6.5 | 69.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 31 | 35 | 15 | 10 | 8 | 7.5 | 6 | 6 | 55.0 | 55.0 | 55.0 | 55.0 | 8 | 15 | 71.0 | 8 | 15 | 51.0 | 7 | 6.5 | 6 | 6.5 | 49.6 | 151 | 163 | 175 | 8 | 6.5 | 69.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 32 | 36 | 16 | 10 | 8 | 7.5 | 6 | 6 | 55.8 | 56.0 | 56.0 | 56.0 | 8 | 14 | 70.0 | 8 | 14 | 50.0 | 7 | 6.5 | 6 | 6.5 | 50.0 | 152 | 164 | 176 | 8 | 6 | 69.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 33 | 37 | 16 | 10 | 8 | 7 | 6 | 6 | 55.8 | 57.0 | 57.0 | 57.0 | 8 | 14 | 69.5 | 8 | 14 | 49.5 | 7 | 6.5 | 6 | 6.5 | 50.1 | 153 | 165 | 177 | 8 | 6 | 69.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 34 | 38 | 16 | 10 | 8 | 7 | 6 | 6 | 55.6 | 58.0 | 58.0 | 58.0 | 8 | 14 | 69.0 | 8 | 14 | 48.5 | 7 | 6.5 | 6 | 6 | 50.3 | 154 | 166 | 178 | 8 | 6 | 69.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 35 | 39 | 17 | 10 | 8 | 7 | 6 | 6 | 56.5 | 59.0 | 59.0 | 59.0 | 8 | 13 | 68.5 | 8 | 13 | 47.5 | 7 | 6 | 6 | 6 | 50.8 | 155 | 167 | 179 | 8 | 6 | 69.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 35 | 40 | 17 | 10 | 8 | 6 | 7 | 7.5 | 61.5 | 59.0 | 59.0 | 59.0 | 8 | 12 | 68.5 | 8 | 12 | 48.0 | 7 | 6 | 6 | 6 | 50.8 | 156 | 168 | 180 | 9 | 7 | 75.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 36 | 41 | 17 | 10 | 8 | 6.5 | 7 | 7 | 61.5 | 60.0 | 60.0 | 66.0 | 8 | 13 | 68.0 | 8 | 13 | 47.5 | 7 | 6 | 7 | 8 | 53.9 | 157 | 169 | 181 | 9 | 7 | 75.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |

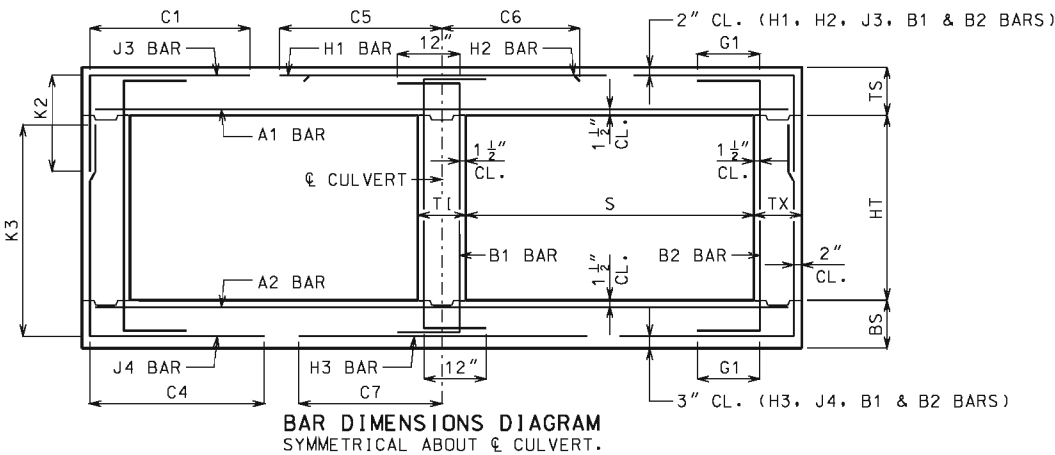
| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 13 FT OR 14 FT | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|-------|--------|---------|------|---------|-------|---------|------|------------------|------|------|----|---------|--------|---------|------|---------|------|------|------------------------------|-----------|----|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=13' | HT=14' | | | | | | | | | | HT=13' | HT=14' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 12 | 9 | 11 | 6 | 8 | 5 | 6 | 70.4 | 35.0 | 35.0 | 6 | 16 | 139.0 | 6 | 16 | 47.0 | 5 | 6 | 6 | 6 | 96.1 | 164 | 176 | 6 | 6 | 64.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | |
| 2 FT | 15 | 13 | 10 | 11 | 6 | 8 | 5 | 6 | 71.0 | 35.0 | 35.0 | 6 | 16 | 139.5 | 6 | 16 | 47.5 | 5 | 6 | 6 | 6.5 | 87.6 | 165 | 177 | 6 | 6.5 | 63.5 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | |
| 4 FT | 12 | 12 | 10 | 11 | 6 | 7.5 | 6 | 7.5 | 100.0 | 36.0 | 36.0 | 6 | 13 | 94.5 | 6 | 13 | 40.0 | 5 | 6 | 6 | 6 | 77.9 | 164 | 176 | 7 | 6.5 | 65.5 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | |
| 6 FT | 12 | 13 | 10 | 11 | 6 | 8 | 6 | 7 | 74.8 | 36.0 | 36.0 | 6 | 12 | 69.0 | 6 | 12 | 38.5 | 5 | 6 | 6 | 6 | 72.4 | 165 | 177 | 7 | 6.5 | 65.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | |
| 8 FT | 13 | 14 | 11 | 11 | 5 | 6 | 6 | 7 | 68.4 | 37.0 | 37.0 | 7 | 16 | 68.0 | 7 | 16 | 41.0 | 6 | 8 | 6 | 7 | 68.4 | 166 | 178 | 7 | 6 | 64.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 10 FT | 14 | 16 | 11 | 11 | 5 | 6 | 6 | 6.5 | 65.4 | 38.0 | 38.0 | 7 | 15 | 66.5 | 7 | 15 | 40.5 | 6 | 7 | 6 | 6.5 | 66.8 | 168 | 180 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 12 FT | 15 | 17 | 12 | 11 | 6 | 8 | 6 | 6.5 | 69.4 | 39.0 | 39.0 | 7 | 14 | 73.0 | 7 | 14 | 48.0 | 6 | 7 | 6 | 7 | 64.6 | 169 | 181 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 14 FT | 17 | 18 | 12 | 11 | 6 | 7.5 | 6 | 6.5 | 67.9 | 41.0 | 41.0 | 7 | 15 | 72.0 | 7 | 15 | 48.0 | 6 | 6 | 6 | 6 | 63.0 | 170 | 182 | 7 | 6 | 63.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 16 FT | 18 | 20 | 13 | 11 | 6 | 7 | 6 | 6.5 | 66.9 | 42.0 | 42.0 | 7 | 14 | 71.5 | 7 | 14 | 47.5 | 6 | 6 | 6 | 7 | 62.1 | 172 | 184 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 18 FT | 19 | 21 | 13 | 11 | 6 | 6.5 | 6 | 6 | 65.6 | 43.0 | 43.0 | 7 | 13 | 71.0 | 7 | 13 | 47.5 | 7 | 8 | 6 | 6 | 61.0 | 173 | 185 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 20 FT | 21 | 23 | 14 | 11 | 6 | 6 | 6 | 6 | 65.4 | 45.0 | 45.0 | 7 | 14 | 70.0 | 7 | 14 | 47.5 | 7 | 8 | 6 | 7 | 60.6 | 175 | 187 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 22 FT | 22 | 24 | 14 | 11 | 6 | 6 | 7 | 8 | 69.4 | 46.0 | 46.0 | 7 | 13 | 69.5 | 7 | 13 | 47.0 | 7 | 7 | 6 | 6 | 59.8 | 176 | 188 | 7 | 6.5 | 63.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 24 FT | 23 | 26 | 15 | 11 | 7 | 7.5 | 7 | 8 | 69.5 | 47.0 | 47.0 | 7 | 13 | 69.0 | 7 | 13 | 47.0 | 7 | 7.5 | 6 | 7 | 59.5 | 178 | 190 | 7 | 6.5 | 63.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 26 FT | 24 | 27 | 15 | 11 | 7 | 7 | 7 | 7.5 | 69.0 | 48.0 | 48.0 | 7 | 13 | 68.5 | 7 | 13 | 47.0 | 7 | 7 | 6 | 6.5 | 59.3 | 179 | 191 | 7 | 6 | 63.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 28 FT | 25 | 29 | 16 | 11 | 7 | 6.5 | 7 | 7.5 | 69.5 | 49.0 | 49.0 | 7 | 13 | 67.5 | 7 | 13 | 46.5 | 7 | 7 | 6 | 7 | 59.5 | 181 | 193 | 8 | 7.5 | 69.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 30 FT | 27 | 30 | 16 | 11 | 7 | 6.5 | 7 | 7 | 69.3 | 51.0 | 51.0 | 7 | 13 | 66.0 | 7 | 13 | 45.5 | 7 | 7 | 6 | 6.5 | 59.5 | 182 | 194 | 8 | 7.5 | 69.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 32 FT | 28 | 31 | 16 | 11 | 7 | 6.5 | 7 | 7.5 | 67.1 | 52.0 | 52.0 | 7 | 12 | 65.0 | 7 | 12 | 44.5 | 7 | 7 | 6 | 7 | 57.1 | 183 | 195 | 8 | 7 | 69.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |
| 34 FT | 29 | 32 | 17 | 11 | 7 | 6 | 7 | 7.5 | 67.8 | 53.0 | 53.0 | 7 | 12 | 64.0 | 7 | 12 | 44.0 | 7 | 6.5 | 6 | 7 | 57.5 | 184 | 196 | 8 | 7 | 69.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | |
| 36 FT | 30 | 34 | 17 | 11 | 7 | 6 | 7 | 6.5 | 67.8 | 54.0 | 54.0 | 7 | 12 | 63.0 | 7 | 12 | 43.0 | 7 | 7 | 6 | 7 | 57.6 | 186 | 198 | 8 | 6.5 | 69.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | |
| 38 FT | 31 | 35 | 18 | 11 | 7 | 6 | 7 | 7 | 68.5 | 55.0 | 55.0 | 8 | 15 | 70.0 | 8 | 15 | 50.5 | 7 | 6.5 | 6 | 6.5 | 58.0 | 187 | 199 | 8 | 6.5 | 69.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | |
| 40 FT | 32 | 36 | 18 | 11 | 8 | 7.5 | 7 | 6.5 | 68.4 | 56.0 | 56.0 | 8 | 14 | 69.5 | 8 | 14 | 49.5 | 7 | 6.5 | 6 | 6.5 | 58.1 | 188 | 200 | 8 | 6 | 69.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | |
| 42 FT | 33 | 37 | 19 | 11 | 8 | 7 | 7 | 7 | 69.1 | 57.0 | 57.0 | 8 | 14 | 69.0 | 8 | 14 | 48.5 | 7 | 6.5 | 6 | 6.5 | 58.5 | 189 | 201 | 8 | 6 | 69.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | |
| 44 FT | 33 | 38 | 20 | 11 | 8 | 7 | 7 | 7 | 69.9 | 57.0 | 57.0 | 8 | 14 | 69.0 | 8 | 14 | 49.0 | 7 | 6 | 6 | 6 | 58.9 | 190 | 202 | 8 | 6 | 69.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | |
| 46 FT | 34 | 39 | 20 | 11 | 8 | 7 | 7 | 6 | 69.8 | 58.0 | 58.0 | 8 | 14 | 68.5 | 8 | 14 | 48.5 | 7 | 6 | 6 | 6 | 59.0 | 191 | 203 | 8 | 6 | 69.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | |
| 48 FT | 35 | 41 | 21 | 11 | 8 | 6.5 | 7 | 6.5 | 70.6 | 65.0 | 65.0 | 8 | 13 | 68.0 | 8 | 13 | 47.5 | 7 | 6 | 7 | 8 | 62.5 | 193 | 205 | 9 | 7 | 75.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | |
| 50 FT | 36 | 42 | 22 | 11 | 8 | 6.5 | 7 | 6.5 | 71.4 | 66.0 | 66.0 | 8 | 14 | 67.0 | 8 | 14 | 47.5 | 7 | 6 | 7 | 7.5 | 63.0 | 194 | 206 | 9 | 7 | 75.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | |

| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 15 FT OR 16 FT | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|-------|--------|---------|------|---------|-------|---------|------|------------------|------|------|----|---------|--------|---------|------|---------|------|------|------|-----------|------------------------------|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=15' | HT=16' | | | | | | | | | | HT=15' | HT=16' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 13 | 12 | 13 | 6 | 8 | 5 | 6 | 72.6 | 35.0 | 35.0 | 6 | 16 | 141.0 | 6 | 16 | 46.0 | 5 | 6.5 | 6 | 7.5 | 102.5 | 189 | 201 | 6 | 6.5 | 64.5 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 15 | 13 | 12 | 13 | 6 | 8 | 6 | 8 | 75.6 | 35.0 | 39.0 | 6 | 16 | 144.0 | 6 | 16 | 47.5 | 5 | 6 | 6 | 7 | 95.8 | 189 | 201 | 6 | 6 | 63.5 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 12 | 12 | 12 | 13 | 6 | 8 | 6 | 7.5 | 118.3 | 36.0 | 36.0 | 6 | 13 | 86.5 | 6 | 13 | 40.0 | 5 | 6 | 6 | 6 | 86.6 | 188 | 200 | 7 | 6.5 | 65.5 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 12 | 13 | 12 | 13 | 5 | 6 | 6 | 7 | 86.4 | 36.0 | 36.0 | 6 | 12 | 68.0 | 6 | 12 | 39.0 | 5 | 6 | 6 | 6 | 83.0 | 189 | 201 | 7 | 6 | 65.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 13 | 15 | 13 | 13 | 5 | 6 | 6 | 7 | 78.9 | 37.0 | 37.0 | 6 | 12 | 64.5 | 6 | 12 | 38.0 | 6 | 7.5 | 6 | 6.5 | 80.3 | 191 | 203 | 7 | 6.5 | 64.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 14 | 16 | 13 | 13 | 5 | 6 | 6 | 6.5 | 75.0 | 38.0 | 38.0 | 7 | 15 | 66.0 | 7 | 15 | 41.0 | 6 | 7 | 6 | 6.5 | 77.3 | 192 | 204 | 7 | 6.5 | 64.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 15 | 17 | 14 | 13 | 6 | 8 | 6 | 6.5 | 78.5 | 39.0 | 39.0 | 7 | 15 | 73.0 | 7 | 15 | 48.5 | 6 | 6.5 | 6 | 6.5 | 74.1 | 193 | 205 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 16 | 19 | 14 | 13 | 6 | 8 | 6 | 6 | 77.0 | 40.0 | 40.0 | 7 | 14 | 72.0 | 7 | 14 | 48.5 | 6 | 6 | 6 | 6 | 73.6 | 195 | 207 | 7 | 6.5 | 64.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 18 | 20 | 15 | 13 | 6 | 7 | 6 | 6 | 76.5 | 42.0 | 42.0 | 7 | 14 | 71.5 | 7 | 14 | 48.5 | 6 | 6 | 6 | 6 | 72.1 | 196 | 208 | 7 | 6.5 | 64.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 19 | 21 | 15 | 13 | 6 | 6.5 | 7 | 7.5 | 80.5 | 43.0 | 49.0 | 7 | 14 | 71.0 | 7 | 14 | 48.5 | 7 | 8 | 7 | 7 | 74.1 | 197 | 209 | 7 | 6.5 | 64.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 20 | 23 | 16 | 13 | 6 | 6.5 | 7 | 7.5 | 79.9 | 44.0 | 50.0 | 7 | 13 | 70.5 | 7 | 13 | 48.0 | 7 | 7.5 | 7 | 8 | 73.8 | 199 | 211 | 7 | 6.5 | 64.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 22 | 25 | 17 | 13 | 6 | 6 | 7 | 7.5 | 79.8 | 46.0 | 46.0 | 7 | 14 | 69.5 | 7 | 14 | 48.0 | 7 | 7.5 | 6 | 6 | 70.5 | 201 | 213 | 7 | 6.5 | 64.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 23 | 26 | 18 | 13 | 7 | 7.5 | 7 | 7.5 | 79.5 | 47.0 | 47.0 | 7 | 13 | 69.0 | 7 | 13 | 47.5 | 7 | 7.5 | 6 | 6 | 69.9 | 202 | 214 | 7 | 6.5 | 64.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 24 | 27 | 18 | 13 | 7 | 7.5 | 7 | 7 | 79.1 | 48.0 | 48.0 | 7 | 13 | 68.5 | 7 | 13 | 47.5 | 7 | 6.5 | 6 | 6 | 69.6 | 203 | 215 | 7 | 6 | 64.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 25 | 29 | 19 | 13 | 7 | 7 | 7 | 7 | 79.5 | 49.0 | 49.0 | 7 | 13 | 68.0 | 7 | 13 | 47.5 | 7 | 7 | 6 | 6 | 70.0 | 205 | 217 | 8 | 7.5 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 26 | 30 | 20 | 13 | 7 | 6.5 | 7 | 7 | 79.8 | 50.0 | 50.0 | 7 | 13 | 67.0 | 7 | 13 | 47.0 | 7 | 6.5 | 6 | 6 | 69.9 | 206 | 218 | 8 | 7.5 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 27 | 31 | 20 | 13 | 7 | 6.5 | 7 | 7 | 77.4 | 51.0 | 51.0 | 7 | 13 | 66.5 | 7 | 13 | 47.0 | 7 | 6.5 | 6 | 6 | 67.5 | 207 | 219 | 8 | 7 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 28 | 32 | 20 | 13 | 7 | 6 | 7 | 7 | 77.4 | 52.0 | 52.0 | 7 | 12 | 65.5 | 7 | 12 | 46.0 | 7 | 6 | 6 | 6 | 67.6 | 208 | 220 | 8 | 7 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 29 | 34 | 21 | 13 | 7 | 6 | 7 | 7 | 78.0 | 53.0 | 53.0 | 7 | 12 | 64.5 | 7 | 12 | 45.0 | 7 | 6.5 | 6 | 6 | 68.1 | 210 | 222 | 8 | 6.5 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 30 | 35 | 22 | 13 | 7 | 6 | 7 | 6.5 | 78.6 | 54.0 | 60.0 | 7 | 12 | 63.5 | 7 | 12 | 44.5 | 7 | 6.5 | 7 | 7.5 | 71.4 | 211 | 223 | 8 | 6.5 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 31 | 36 | 22 | 13 | 8 | 7.5 | 7 | 6 | 78.6 | 61.0 | 61.0 | 8 | 15 | 71.0 | 8 | 15 | 51.5 | 7 | 6.5 | 7 | 7.5 | 71.5 | 212 | 224 | 8 | 6 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 32 | 37 | 23 | 13 | 8 | 7.5 | 7 | 6.5 | 79.3 | 56.0 | 62.0 | 8 | 14 | 70.0 | 8 | 14 | 51.0 | 7 | 6 | 7 | 7.5 | 71.8 | 213 | 225 | 8 | 6 | 70.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 33 | 39 | 24 | 13 | 8 | 7 | 7 | 6.5 | 80.0 | 57.0 | 63.0 | 8 | 14 | 70.0 | 8 | 14 | 50.0 | 7 | 6 | 7 | 7 | 72.4 | 215 | 227 | 8 | 6 | 70.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 34 | 40 | 25 | 13 | 8 | 7 | 7 | 6.5 | 80.6 | 58.0 | 64.0 | 8 | 14 | 69.5 | 8 | 14 | 49.0 | 7 | 6 | 7 | 7.5 | 72.6 | 216 | 228 | 9 | 7 | 76.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 35 | 41 | 26 | 13 | 8 | 7 | 7 | 6 | 81.4 | 65.0 | 65.0 | 8 | 14 | 68.5 | 8 | 14 | 48.5 | 7 | 6 | 7 | 7.5 | 73.0 | 217 | 229 | 9 | 7 | 76.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 35 | 42 | 27 | 13 | 8 | 6.5 | 7 | 6 | 82.0 | 65.0 | 65.0 | 8 | 13 | 68.5 | 8 | 13 | 48.5 | 7 | 6 | 7 | 7.5 | 73.3 | 218 | 230 | 9 | 7 | 76.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|--------|---------|------|-------------------------------------|---------|------------------|------|---------|------|---------|------|------|-------|-------|--------|---------|------|-----------|---------|------|---------|------|----|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | |
| 1 FT | 15 | 12 | 8 | 8 | 6 | 8 | 5 | 8 | 72.9 | 35.0 | 35.0 | 35.0 | 6 | 16 | 146.0 | 6 | 16 | 51.0 | 5 | 6 | 5 | 6 | 64.9 | 104 | 116 | 128 | 6 | 6 | 66.5 | 5 | 12 | 5 | 12 | 12 |
| 2 FT | 17 | 13 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 72.9 | 37.0 | 37.0 | 37.0 | 6 | 14 | 146.0 | 6 | 14 | 45.5 | 5 | 6 | 5 | 6 | 57.8 | 105 | 117 | 129 | 6 | 6 | 65.5 | 5 | 12 | 5 | 12 | 12 |
| 4 FT | 13 | 12 | 8 | 8 | 6 | 7 | 5 | 6 | 53.1 | 33.0 | 33.0 | 33.0 | 6 | 12 | 92.5 | 6 | 12 | 41.5 | 5 | 6 | 6 | 6.5 | 53.3 | 104 | 116 | 128 | 7 | 6 | 68.0 | 5 | 12 | 5 | 12 | 12 |
| 6 FT | 13 | 13 | 8 | 8 | 6 | 7.5 | 6 | 7.5 | 50.4 | 33.0 | 33.0 | 37.0 | 7 | 15 | 78.5 | 7 | 15 | 42.5 | 5 | 6 | 6 | 7 | 48.9 | 105 | 117 | 129 | 7 | 6 | 67.0 | 5 | 12 | 5 | 12 | 12 |
| 8 FT | 14 | 15 | 8 | 8 | 6 | 8 | 5 | 6 | 44.0 | 34.0 | 34.0 | 34.0 | 7 | 14 | 72.5 | 7 | 14 | 41.5 | 6 | 7.5 | 5 | 6.5 | 42.8 | 107 | 119 | 131 | 7 | 6 | 67.0 | 5 | 12 | 5 | 11 | 0 |
| 10 FT | 15 | 16 | 8 | 8 | 6 | 7.5 | 6 | 8 | 50.5 | 35.0 | 35.0 | 35.0 | 7 | 13 | 78.0 | 7 | 13 | 49.0 | 6 | 7 | 5 | 6.5 | 40.9 | 108 | 120 | 132 | 7 | 6 | 66.5 | 5 | 12 | 5 | 10 | 0 |
| 12 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 6 | 8 | 48.4 | 37.0 | 37.0 | 37.0 | 7 | 13 | 76.5 | 7 | 13 | 48.5 | 6 | 6.5 | 5 | 6 | 39.6 | 110 | 122 | 134 | 7 | 6 | 66.5 | 5 | 12 | 5 | 9.5 | 0 |
| 14 FT | 18 | 19 | 8 | 8 | 6 | 7 | 6 | 7.5 | 47.0 | 38.0 | 38.0 | 42.0 | 7 | 13 | 75.5 | 7 | 13 | 48.5 | 6 | 6 | 6 | 8 | 41.5 | 111 | 123 | 135 | 7 | 6 | 66.5 | 5 | 12 | 5 | 9.5 | 0 |
| 16 FT | 19 | 21 | 8 | 8 | 6 | 6 | 6 | 6.5 | 46.1 | 39.0 | 43.0 | 43.0 | 7 | 12 | 75.0 | 7 | 12 | 48.0 | 6 | 6 | 6 | 7 | 40.8 | 113 | 125 | 137 | 7 | 6 | 66.5 | 5 | 12 | 5 | 9 | 0 |
| 18 FT | 21 | 22 | 9 | 8 | 6 | 6 | 6 | 7.5 | 46.0 | 41.0 | 41.0 | 41.0 | 7 | 12 | 74.0 | 7 | 12 | 48.0 | 7 | 7.5 | 5 | 6 | 37.8 | 114 | 126 | 138 | 7 | 6 | 66.0 | 5 | 12 | 5 | 8.5 | 0 |
| 20 FT | 22 | 24 | 9 | 8 | 6 | 6 | 6 | 6.5 | 45.5 | 42.0 | 42.0 | 46.0 | 7 | 12 | 73.5 | 7 | 12 | 47.5 | 7 | 7.5 | 6 | 7 | 40.3 | 116 | 128 | 140 | 7 | 6 | 66.0 | 5 | 12 | 5 | 8.5 | 0 |
| 22 FT | 24 | 26 | 10 | 8 | 7 | 7.5 | 6 | 7.5 | 46.0 | 44.0 | 44.0 | 44.0 | 7 | 12 | 72.5 | 7 | 12 | 47.5 | 7 | 7.5 | 5 | 6 | 37.5 | 118 | 130 | 142 | 7 | 6 | 66.0 | 5 | 12 | 5 | 8 | 0 |
| 24 FT | 25 | 27 | 11 | 8 | 7 | 7 | 6 | 8 | 46.5 | 45.0 | 45.0 | 45.0 | 7 | 12 | 71.5 | 7 | 12 | 47.0 | 7 | 6.5 | 5 | 6 | 37.5 | 119 | 131 | 143 | 8 | 7 | 72.0 | 5 | 12 | 5 | 7.5 | 0 |
| 26 FT | 27 | 29 | 11 | 8 | 7 | 6.5 | 6 | 8 | 46.1 | 47.0 | 47.0 | 51.0 | 7 | 12 | 70.5 | 7 | 12 | 47.0 | 7 | 7 | 6 | 7.5 | 40.6 | 121 | 133 | 145 | 8 | 7 | 72.0 | 5 | 12 | 5 | 7.5 | 0 |
| 28 FT | 28 | 30 | 11 | 8 | 7 | 6.5 | 6 | 7 | 45.9 | 52.0 | 52.0 | 52.0 | 7 | 12 | 69.5 | 7 | 12 | 46.5 | 7 | 6.5 | 6 | 7 | 40.5 | 122 | 134 | 146 | 8 | 7 | 72.0 | 5 | 12 | 5 | 7.5 | 0 |
| 30 FT | 29 | 32 | 12 | 8 | 7 | 6 | 6 | 7.5 | 46.9 | 53.0 | 53.0 | 53.0 | 7 | 12 | 69.0 | 7 | 12 | 46.5 | 7 | 7 | 6 | 7.5 | 41.0 | 124 | 136 | 148 | 8 | 7 | 72.0 | 5 | 12 | 5 | 7 | 0 |
| 32 FT | 30 | 33 | 12 | 8 | 7 | 6 | 6 | 7.5 | 45.4 | 54.0 | 54.0 | 54.0 | 7 | 12 | 67.5 | 7 | 12 | 46.0 | 7 | 6.5 | 6 | 7 | 39.5 | 125 | 137 | 149 | 8 | 6.5 | 72.0 | 5 | 12 | 5 | 7 | 0 |
| 34 FT | 31 | 34 | 12 | 8 | 8 | 7.5 | 6 | 7.5 | 45.3 | 55.0 | 55.0 | 55.0 | 8 | 15 | 75.0 | 8 | 15 | 53.0 | 7 | 6.5 | 6 | 7 | 39.6 | 126 | 138 | 150 | 8 | 6.5 | 72.0 | 5 | 12 | 5 | 7 | 0 |
| 36 FT | 32 | 36 | 12 | 8 | 8 | 7 | 6 | 7 | 45.4 | 56.0 | 56.0 | 56.0 | 8 | 14 | 73.5 | 8 | 14 | 52.5 | 7 | 6.5 | 6 | 6.5 | 39.9 | 128 | 140 | 152 | 8 | 6 | 72.0 | 5 | 12 | 5 | 7 | 0 |
| 38 FT | 33 | 37 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 45.4 | 57.0 | 57.0 | 57.0 | 8 | 13 | 72.5 | 8 | 13 | 51.5 | 7 | 6.5 | 6 | 6.5 | 40.0 | 129 | 141 | 153 | 8 | 6 | 72.0 | 5 | 12 | 5 | 6.5 | 0 |
| 40 FT | 35 | 38 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 45.1 | 59.0 | 59.0 | 59.0 | 8 | 13 | 71.0 | 8 | 13 | 49.5 | 7 | 6 | 6 | 6 | 40.3 | 130 | 142 | 154 | 8 | 6 | 71.5 | 5 | 12 | 5 | 6 | 0 |
| 42 FT | 35 | 39 | 13 | 8 | 8 | 6 | 6 | 6.5 | 46.1 | 59.0 | 59.0 | 59.0 | 8 | 12 | 71.0 | 8 | 12 | 50.0 | 7 | 6 | 6 | 6 | 40.6 | 131 | 143 | 155 | 8 | 6 | 72.0 | 5 | 12 | 5 | 6.5 | 0 |
| 44 FT | 36 | 41 | 13 | 8 | 8 | 6 | 6 | 6.5 | 46.3 | 60.0 | 60.0 | 60.0 | 8 | 12 | 70.5 | 8 | 12 | 49.0 | 7 | 6 | 7 | 7 | 43.9 | 133 | 145 | 157 | 9 | 7 | 77.5 | 5 | 9 | 5 | 6 | 0 |
| 46 FT | 37 | 42 | 13 | 8 | 8 | 6 | 6 | 6 | 46.3 | 61.0 | 61.0 | 61.0 | 8 | 12 | 70.0 | 8 | 12 | 48.0 | 7 | 6 | 7 | 7 | 44.1 | 134 | 146 | 158 | 9 | 7 | 77.5 | 5 | 6.5 | 6 | 8.5 | 0 |
| 48 FT | 38 | 43 | 13 | 9 | 8 | 6 | 6 | 6 | 46.3 | 62.0 | 62.0 | 62.0 | 8 | 12 | 70.5 | 8 | 12 | 48.5 | 7 | 6 | 7 | 6.5 | 44.3 | 135 | 147 | 159 | 9 | 7 | 77.5 | 5 | 12 | 6 | 8 | 0 |
| 50 FT | 39 | 44 | 14 | 9 | 8 | 6 | 6 | 6 | 47.1 | 63.0 | 63.0 | 63.0 | 8 | 12 | 70.0 | 8 | 12 | 47.5 | 8 | 7.5 | 7 | 7 | 44.8 | 136 | 148 | 160 | 9 | 6.5 | 77.5 | 5 | 12 | 6 | 8 | 0 |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|--------|---------|------|---------|------|------------------|------|------|------|---------|--------|---------|--------|---------|------|----|------|-----------|---------------------------------------|------|----|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 12 | 9 | 10 | 6 | 8 | 5 | 6.5 | 73.9 | 35.0 | 35.0 | 35.0 | 6 | 16 | 147.0 | 6 | 16 | 51.0 | 5 | 6 | 6 | 6 | 88.3 | 140 | 152 | 164 | 6 | 6 | 67.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 17 | 13 | 9 | 10 | 6 | 7.5 | 5 | 6.5 | 73.9 | 37.0 | 37.0 | 37.0 | 6 | 14 | 147.0 | 6 | 14 | 46.0 | 5 | 6 | 6 | 6 | 80.4 | 141 | 153 | 165 | 6 | 6 | 66.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 13 | 12 | 9 | 10 | 6 | 7 | 6 | 6 | 85.5 | 33.0 | 37.0 | 37.0 | 6 | 12 | 96.0 | 6 | 12 | 42.0 | 5 | 6 | 6 | 6 | 70.6 | 140 | 152 | 164 | 7 | 6 | 68.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 13 | 14 | 10 | 10 | 6 | 8 | 6 | 7 | 67.4 | 33.0 | 33.0 | 37.0 | 7 | 15 | 76.5 | 7 | 15 | 43.0 | 6 | 8 | 6 | 6.5 | 66.0 | 142 | 154 | 166 | 7 | 6.5 | 68.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 14 | 15 | 10 | 10 | 6 | 8 | 6 | 6.5 | 62.0 | 34.0 | 34.0 | 38.0 | 7 | 14 | 72.0 | 7 | 14 | 42.0 | 6 | 7.5 | 6 | 6.5 | 62.1 | 143 | 155 | 167 | 7 | 6 | 67.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 15 | 17 | 10 | 10 | 6 | 8 | 6 | 6.5 | 64.6 | 35.0 | 35.0 | 39.0 | 7 | 14 | 78.0 | 7 | 14 | 49.5 | 6 | 7 | 6 | 6.5 | 59.6 | 145 | 157 | 169 | 7 | 6.5 | 67.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 16 | 18 | 11 | 10 | 6 | 7.5 | 6 | 6.5 | 62.6 | 36.0 | 36.0 | 40.0 | 7 | 13 | 76.5 | 7 | 13 | 49.0 | 6 | 6.5 | 6 | 7.5 | 57.4 | 146 | 158 | 170 | 7 | 6 | 67.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 18 | 20 | 12 | 10 | 6 | 7 | 6 | 7 | 62.0 | 38.0 | 38.0 | 42.0 | 7 | 13 | 75.5 | 7 | 13 | 49.0 | 6 | 6 | 6 | 8 | 56.4 | 148 | 160 | 172 | 7 | 6.5 | 67.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 19 | 21 | 12 | 10 | 6 | 6.5 | 6 | 6.5 | 60.9 | 39.0 | 39.0 | 43.0 | 7 | 13 | 74.5 | 7 | 13 | 48.5 | 7 | 8 | 6 | 7.5 | 55.4 | 149 | 161 | 173 | 7 | 6 | 66.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 21 | 22 | 12 | 10 | 6 | 6 | 6 | 6.5 | 59.8 | 41.0 | 45.0 | 45.0 | 7 | 13 | 74.0 | 7 | 13 | 48.5 | 7 | 7 | 6 | 6 | 54.6 | 150 | 162 | 174 | 7 | 6 | 66.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 22 | 24 | 13 | 10 | 6 | 6 | 6 | 6.5 | 59.9 | 42.0 | 42.0 | 46.0 | 7 | 12 | 73.5 | 7 | 12 | 48.5 | 7 | 7 | 6 | 7.5 | 54.4 | 152 | 164 | 176 | 7 | 6 | 66.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 23 | 26 | 13 | 10 | 7 | 7 | 6 | 6 | 59.3 | 43.0 | 43.0 | 47.0 | 7 | 12 | 72.5 | 7 | 12 | 48.0 | 7 | 7 | 6 | 7 | 53.9 | 154 | 166 | 178 | 7 | 6 | 66.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 25 | 28 | 14 | 10 | 7 | 7 | 6 | 6 | 59.5 | 45.0 | 45.0 | 49.0 | 7 | 12 | 71.5 | 7 | 12 | 48.0 | 7 | 7 | 6 | 7.5 | 54.0 | 156 | 168 | 180 | 7 | 6 | 66.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 26 | 29 | 14 | 10 | 7 | 6.5 | 6 | 6 | 59.0 | 50.0 | 50.0 | 50.0 | 7 | 12 | 71.0 | 7 | 12 | 47.5 | 7 | 7 | 6 | 7.5 | 53.6 | 157 | 169 | 181 | 8 | 7 | 72.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 27 | 31 | 15 | 10 | 7 | 6 | 6 | 6 | 59.6 | 51.0 | 51.0 | 51.0 | 7 | 12 | 70.5 | 7 | 12 | 47.5 | 7 | 7 | 6 | 7.5 | 53.9 | 159 | 171 | 183 | 8 | 7 | 72.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 29 | 32 | 15 | 10 | 7 | 6 | 7 | 8 | 64.3 | 53.0 | 53.0 | 53.0 | 7 | 12 | 69.0 | 7 | 12 | 47.0 | 7 | 6.5 | 6 | 7.5 | 54.0 | 160 | 172 | 184 | 8 | 7 | 72.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 30 | 33 | 16 | 10 | 7 | 6 | 6 | 6 | 59.9 | 54.0 | 54.0 | 54.0 | 7 | 12 | 68.0 | 7 | 12 | 46.5 | 7 | 6 | 6 | 7 | 54.3 | 161 | 173 | 185 | 8 | 6.5 | 72.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 31 | 35 | 16 | 10 | 8 | 7.5 | 6 | 6 | 58.3 | 55.0 | 55.0 | 55.0 | 8 | 15 | 75.0 | 8 | 15 | 53.0 | 7 | 6.5 | 6 | 6.5 | 52.6 | 163 | 175 | 187 | 8 | 6.5 | 72.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 32 | 36 | 16 | 10 | 8 | 7.5 | 7 | 7.5 | 63.1 | 56.0 | 56.0 | 56.0 | 8 | 14 | 74.0 | 8 | 14 | 52.5 | 7 | 6.5 | 6 | 6.5 | 52.8 | 164 | 176 | 188 | 8 | 6 | 72.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 33 | 37 | 16 | 10 | 8 | 7 | 7 | 7 | 63.1 | 57.0 | 57.0 | 57.0 | 8 | 14 | 72.5 | 8 | 14 | 52.0 | 7 | 6 | 6 | 6.5 | 52.9 | 165 | 177 | 189 | 8 | 6 | 72.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 34 | 38 | 17 | 10 | 8 | 7 | 7 | 7.5 | 63.9 | 58.0 | 58.0 | 58.0 | 8 | 14 | 72.0 | 8 | 14 | 51.0 | 7 | 6 | 6 | 6 | 53.3 | 166 | 178 | 190 | 8 | 6 | 72.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 35 | 40 | 18 | 10 | 8 | 6.5 | 7 | 7.5 | 64.8 | 59.0 | 59.0 | 59.0 | 8 | 13 | 71.5 | 8 | 13 | 50.0 | 7 | 6 | 6 | 6 | 53.8 | 168 | 180 | 192 | 9 | 7 | 78.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 36 | 41 | 18 | 10 | 8 | 6.5 | 7 | 7.5 | 64.6 | 60.0 | 60.0 | 66.0 | 8 | 13 | 71.0 | 8 | 13 | 49.5 | 7 | 6 | 7 | 8 | 56.9 | 169 | 181 | 193 | 9 | 7 | 78.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 37 | 42 | 18 | 10 | 8 | 6.5 | 7 | 6.5 | 64.6 | 61.0 | 61.0 | 67.0 | 8 | 12 | 70.5 | 8 | 12 | 48.5 | 7 | 6 | 7 | 7.5 | 57.0 | 170 | 182 | 194 | 9 | 7 | 78.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 38 | 43 | 19 | 10 | 8 | 6 | 7 | 7 | 65.4 | 62.0 | 62.0 | 68.0 | 8 | 13 | 69.5 | 8 | 13 | 48.0 | 8 | 7.5 | 7 | 7.5 | 57.5 | 171 | 183 | 195 | 9 | 7 | 78.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 39 | 44 | 19 | 10 | 8 | 6 | 7 | 6.5 | 65.3 | 63.0 | 63.0 | 69.0 | 8 | 13 | 69.0 | 8 | 13 | 47.5 | 8 | 7.5 | 7 | 7 | 57.6 | 172 | 184 | 196 | 9 | 6.5 | 78.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|-------|--------|---------|--------|---------|------|---------|------|------------------|------|------|------|---------|--------|---------|--------|---------|------|----|------|-----------|---------------------------------------|------|----|-----|----|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=14' | HT=15' | HT=16' | | | | | | | | | | HT=14' | HT=15' | HT=16' | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 13 | 12 | 13 | 6 | 8 | 6 | 8.5 | 79.3 | 35.0 | 35.0 | 39.0 | 6 | 16 | 152.5 | 6 | 16 | 50.0 | 5 | 6 | 6 | 7 | 102.4 | 177 | 189 | 201 | 6 | 6 | 67.5 | 5 | 11 | 5 | 7 | 12 | | | | | | | | | | |
| 2 FT | 16 | 14 | 12 | 13 | 6 | 7.5 | 5 | 6 | 76.3 | 36.0 | 36.0 | 36.0 | 6 | 15 | 149.5 | 6 | 15 | 48.5 | 6 | 8 | 6 | 7.5 | 96.3 | 178 | 190 | 202 | 6 | 6 | 67.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | |
| 4 FT | 12 | 13 | 12 | 13 | 6 | 7 | 6 | 7 | 101.4 | 36.0 | 36.0 | 36.0 | 6 | 12 | 86.5 | 6 | 12 | 41.5 | 5 | 6 | 6 | 6.5 | 88.5 | 177 | 189 | 201 | 7 | 6.5 | 69.0 | 5 | 10.5 | 5 | 7 | 12 | | | | | | | | | | |
| 6 FT | 13 | 14 | 12 | 13 | 6 | 8 | 6 | 6.5 | 86.3 | 37.0 | 37.0 | 37.0 | 7 | 16 | 74.5 | 7 | 16 | 43.5 | 6 | 8 | 6 | 6.5 | 82.9 | 178 | 190 | 202 | 7 | 6 | 68.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | |
| 8 FT | 13 | 15 | 13 | 13 | 6 | 8 | 6 | 6.5 | 76.4 | 37.0 | 37.0 | 37.0 | 7 | 14 | 70.5 | 7 | 14 | 42.5 | 6 | 7.5 | 6 | 6.5 | 77.9 | 179 | 191 | 203 | 7 | 6 | 68.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 10 FT | 15 | 17 | 13 | 13 | 6 | 8 | 6 | 6 | 80.6 | 39.0 | 39.0 | 39.0 | 7 | 14 | 77.5 | 7 | 14 | 50.5 | 6 | 7 | 6 | 6.5 | 76.0 | 181 | 193 | 205 | 7 | 6.5 | 67.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 12 FT | 16 | 18 | 14 | 13 | 6 | 8 | 6 | 6 | 78.4 | 40.0 | 40.0 | 40.0 | 7 | 14 | 76.5 | 7 | 14 | 50.0 | 6 | 6.5 | 6 | 6.5 | 73.8 | 182 | 194 | 206 | 7 | 6 | 67.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | |
| 14 FT | 17 | 20 | 14 | 13 | 6 | 7.5 | 7 | 7.5 | 81.6 | 41.0 | 41.0 | 41.0 | 7 | 13 | 75.5 | 7 | 13 | 50.0 | 6 | 6 | 6 | 6 | 72.9 | 184 | 196 | 208 | 7 | 6 | 67.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | |
| 16 FT | 19 | 21 | 15 | 13 | 6 | 6.5 | 7 | 8 | 80.9 | 43.0 | 43.0 | 49.0 | 7 | 13 | 75.0 | 7 | 13 | 49.5 | 7 | 8 | 7 | 8 | 74.4 | 185 | 197 | 209 | 7 | 6 | 67.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 18 FT | 20 | 23 | 16 | 13 | 6 | 6.5 | 7 | 8 | 80.1 | 44.0 | 44.0 | 44.0 | 7 | 13 | 74.0 | 7 | 13 | 49.5 | 7 | 7.5 | 6 | 6 | 70.8 | 187 | 199 | 211 | 7 | 6 | 67.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 20 FT | 21 | 24 | 17 | 13 | 6 | 6 | 7 | 7.5 | 79.5 | 45.0 | 45.0 | 45.0 | 7 | 12 | 73.5 | 7 | 12 | 49.5 | 7 | 7 | 6 | 6 | 69.8 | 188 | 200 | 212 | 7 | 6 | 67.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | |
| 22 FT | 23 | 26 | 17 | 13 | 7 | 7.5 | 7 | 7.5 | 78.9 | 47.0 | 47.0 | 47.0 | 7 | 12 | 73.0 | 7 | 12 | 49.0 | 7 | 7 | 6 | 6 | 69.4 | 190 | 202 | 214 | 7 | 6 | 67.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | |
| 24 FT | 24 | 28 | 18 | 13 | 7 | 7 | 7 | 7.5 | 78.6 | 48.0 | 48.0 | 48.0 | 7 | 12 | 72.5 | 7 | 12 | 49.0 | 7 | 7 | 6 | 6.5 | 69.0 | 192 | 204 | 216 | 7 | 6 | 67.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | |
| 26 FT | 26 | 29 | 18 | 13 | 7 | 7 | 7 | 7 | 78.1 | 50.0 | 50.0 | 50.0 | 7 | 12 | 71.5 | 7 | 12 | 49.0 | 7 | 6 | 6 | 6 | 68.5 | 193 | 205 | 217 | 8 | 7 | 73.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | |
| 28 FT | 27 | 31 | 19 | 13 | 7 | 6.5 | 7 | 7 | 78.5 | 51.0 | 51.0 | 51.0 | 7 | 12 | 71.0 | 7 | 12 | 48.5 | 7 | 6.5 | 6 | 6 | 68.6 | 195 | 207 | 219 | 8 | 7 | 73.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |
| 30 FT | 28 | 32 | 19 | 13 | 7 | 6 | 7 | 6 | 78.1 | 52.0 | 52.0 | 52.0 | 7 | 12 | 70.5 | 7 | 12 | 48.5 | 7 | 6.5 | 6 | 6 | 68.5 | 196 | 208 | 220 | 8 | 7 | 73.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |
| 32 FT | 30 | 34 | 20 | 13 | 7 | 6 | 7 | 6.5 | 78.8 | 54.0 | 54.0 | 54.0 | 7 | 12 | 69.0 | 7 | 12 | 47.0 | 7 | 6.5 | 6 | 6 | 68.9 | 198 | 210 | 222 | 8 | 6.5 | 73.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |
| 34 FT | 31 | 35 | 20 | 13 | 7 | 6 | 7 | 6.5 | 76.3 | 55.0 | 55.0 | 55.0 | 8 | 15 | 76.0 | 8 | 15 | 54.0 | 7 | 6.5 | 6 | 6 | 66.4 | 199 | 211 | 223 | 8 | 6.5 | 73.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |
| 36 FT | 32 | 36 | 21 | 13 | 8 | 7.5 | 7 | 6.5 | 76.8 | 56.0 | 56.0 | 56.0 | 8 | 14 | 75.0 | 8 | 14 | 53.5 | 7 | 6 | 6 | 6 | 66.6 | 200 | 212 | 224 | 8 | 6 | 73.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | |
| 38 FT | 33 | 37 | 21 | 13 | 8 | 7 | 7 | 6 | 76.8 | 57.0 | 57.0 | 57.0 | 8 | 14 | 74.0 | 8 | 14 | 53.0 | 7 | 6 | 6 | 6 | 66.6 | 201 | 213 | 225 | 8 | 6 | 73.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | |
| 40 FT | 34 | 39 | 22 | 13 | 8 | 7 | 7 | 6 | 77.5 | 58.0 | 58.0 | 64.0 | 8 | 14 | 73.0 | 8 | 14 | 52.0 | 7 | 6 | 7 | 7.5 | 70.1 | 203 | 215 | 227 | 8 | 6 | 73.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | |
| 42 FT | 35 | 40 | 23 | 13 | 8 | 7 | 7 | 6.5 | 78.1 | 59.0 | 59.0 | 65.0 | 8 | 13 | 72.5 | 8 | 13 | 51.0 | 7 | 6 | 7 | 7.5 | 70.4 | 204 | 216 | 228 | 9 | 7 | 79.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | |
| 44 FT | 35 | 41 | 24 | 13 | 8 | 6 | 7 | 6 | 78.9 | 65.0 | 65.0 | 65.0 | 8 | 12 | 72.5 | 8 | 12 | 52.0 | 8 | 7.5 | 7 | 7 | 70.6 | 205 | 217 | 229 | 9 | 7 | 79.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | |
| 46 FT | 36 | 42 | 25 | 13 | 8 | 6 | 7 | 6 | 79.5 | 66.0 | 66.0 | 66.0 | 8 | 12 | 72.0 | 8 | 12 | 51.0 | 8 | 7 | 7 | 7.5 | 70.9 | 206 | 218 | 230 | 9 | 7 | 79.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | |
| 48 FT | 37 | 43 | 26 | 13 | 8 | 6.5 | 7 | 6 | 80.3 | 67.0 | 67.0 | 67.0 | 8 | 12 | 71.5 | 8 | 12 | 50.0 | 8 | 6.5 | 7 | 7.5 | 71.3 | 207 | 219 | 231 | 9 | 7 | 79.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | |
| 50 FT | 38 | 45 | 27 | 13 | 8 | 6 | 7 | 6 | 81.1 | 68.0 | 68.0 | 68.0 | 8 | 12 | 71.0 | 8 | 12 | 49.0 | 8 | 7 | 7 | 7 | 71.8 | 209 | 221 | 233 | 9 | 6.5 | 79.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



**CONCRETE
DOUBLE BOX CULVERT**
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 15 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

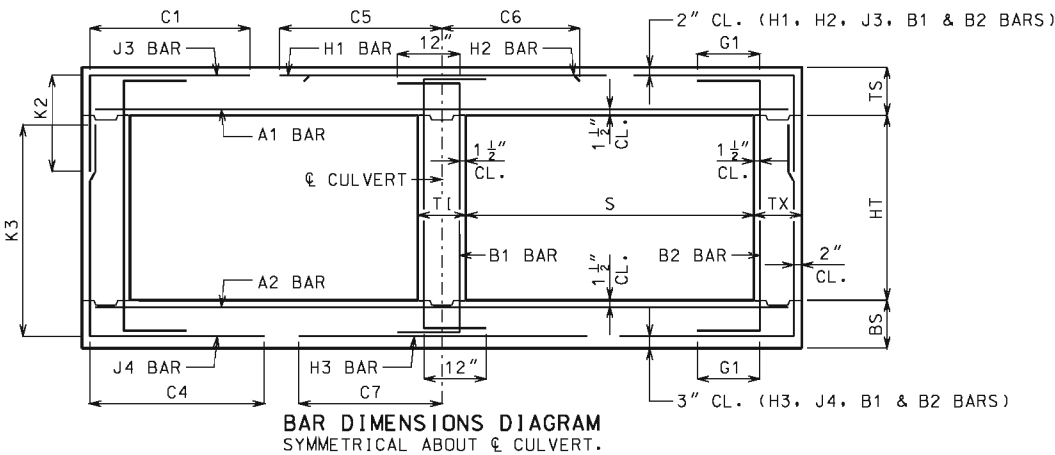
SHEET NO.
25 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | |
|------------------|---------------------|------|------|------|---------------|------|---------|-------|-------|--------|-------|--------|---------|------|-------|---------|------------------|------|---------|------|---------|------|------|-------|-------|--------|---------|-------------------------------------|-----------|---------|------|---------|------|----|------|------|----|-------|-------|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | |
| | SIZE | SPA. | SIZE | SPA. | | | C1 | HT=8' | HT=9' | HT=10' | SIZE | SPA. | | | | | | | | | C5 | SIZE | SPA. | C6 | SIZE | SPA. | | | | | | | | | SIZE | SPA. | C4 | HT=8' | HT=9' |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | HT=8' | HT=9' | HT=10' | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | HT=8' | HT=9' | HT=10' | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | |
| 1 FT | 15 | 12 | 8 | 8 | 6 | 7.5 | 5 | 8 | 76.5 | 35.0 | 35.0 | 35.0 | 6 | 15 | 154.5 | 6 | 15 | 54.0 | 5 | 6 | 6 | 7 | 66.9 | 104 | 116 | 128 | 7 | 7 | 72.5 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 2 FT | 17 | 13 | 8 | 8 | 6 | 7 | 5 | 6.5 | 76.5 | 37.0 | 37.0 | 37.0 | 6 | 14 | 154.5 | 6 | 14 | 50.0 | 5 | 6 | 5 | 6 | 56.4 | 105 | 117 | 129 | 7 | 7 | 71.5 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 4 FT | 13 | 13 | 8 | 8 | 6 | 6.5 | 6 | 7 | 55.6 | 33.0 | 33.0 | 33.0 | 7 | 14 | 97.0 | 7 | 14 | 45.5 | 5 | 6 | 5 | 6 | 49.6 | 105 | 117 | 129 | 7 | 6 | 71.0 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 6 FT | 14 | 14 | 8 | 8 | 6 | 7 | 5 | 6 | 47.1 | 34.0 | 34.0 | 34.0 | 7 | 14 | 82.0 | 7 | 14 | 44.0 | 6 | 8 | 5 | 6 | 45.1 | 106 | 118 | 130 | 7 | 6 | 70.5 | 5 | 12 | 5 | 12 | 12 | | | | | |
| 8 FT | 15 | 16 | 8 | 8 | 6 | 7.5 | 5 | 6 | 48.4 | 35.0 | 35.0 | 35.0 | 7 | 13 | 84.0 | 7 | 13 | 51.0 | 6 | 7 | 5 | 7 | 41.9 | 108 | 120 | 132 | 7 | 6 | 70.0 | 5 | 12 | 5 | 11 | 0 | | | | | |
| 10 FT | 16 | 17 | 8 | 8 | 6 | 7 | 6 | 8 | 49.6 | 36.0 | 36.0 | 36.0 | 7 | 12 | 81.5 | 7 | 12 | 50.5 | 6 | 7 | 5 | 6.5 | 39.9 | 109 | 121 | 133 | 7 | 6 | 69.5 | 5 | 12 | 5 | 10 | 0 | | | | | |
| 12 FT | 18 | 19 | 8 | 8 | 6 | 7 | 6 | 7.5 | 47.5 | 38.0 | 38.0 | 38.0 | 7 | 12 | 80.0 | 7 | 12 | 50.0 | 6 | 6 | 5 | 6 | 38.6 | 111 | 123 | 135 | 7 | 6 | 69.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | |
| 14 FT | 19 | 20 | 8 | 8 | 6 | 6.5 | 6 | 7 | 46.0 | 39.0 | 39.0 | 43.0 | 7 | 12 | 79.0 | 7 | 12 | 49.5 | 6 | 6 | 6 | 7.5 | 40.5 | 112 | 124 | 136 | 7 | 6 | 69.5 | 5 | 12 | 5 | 9.5 | 0 | | | | | |
| 16 FT | 21 | 22 | 8 | 8 | 6 | 6 | 6 | 7 | 44.9 | 45.0 | 45.0 | 45.0 | 7 | 12 | 78.0 | 7 | 12 | 49.5 | 7 | 7.5 | 6 | 7 | 39.9 | 114 | 126 | 138 | 7 | 6 | 69.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | |
| 18 FT | 22 | 23 | 9 | 8 | 6 | 6 | 6 | 7.5 | 45.1 | 42.0 | 42.0 | 42.0 | 8 | 15 | 85.0 | 8 | 15 | 57.0 | 7 | 6.5 | 5 | 6 | 36.8 | 115 | 127 | 139 | 8 | 6.5 | 75.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | |
| 20 FT | 24 | 25 | 9 | 8 | 7 | 7.5 | 6 | 7 | 44.4 | 48.0 | 48.0 | 48.0 | 8 | 15 | 84.0 | 8 | 15 | 57.0 | 7 | 7 | 6 | 7 | 39.4 | 117 | 129 | 141 | 8 | 7 | 75.5 | 5 | 12 | 5 | 8.5 | 0 | | | | | |
| 22 FT | 25 | 27 | 10 | 8 | 7 | 7 | 6 | 7.5 | 45.0 | 45.0 | 45.0 | 49.0 | 8 | 14 | 83.5 | 8 | 14 | 56.5 | 7 | 6.5 | 6 | 7 | 39.5 | 119 | 131 | 143 | 8 | 7 | 75.5 | 5 | 12 | 5 | 8 | 0 | | | | | |
| 24 FT | 27 | 29 | 10 | 8 | 7 | 6.5 | 6 | 6.5 | 44.5 | 51.0 | 51.0 | 51.0 | 8 | 14 | 82.5 | 8 | 14 | 56.5 | 7 | 6.5 | 6 | 6.5 | 39.3 | 121 | 133 | 145 | 8 | 7 | 75.0 | 5 | 12 | 5 | 8 | 0 | | | | | |
| 26 FT | 28 | 31 | 11 | 8 | 7 | 6 | 6 | 7.5 | 45.3 | 52.0 | 52.0 | 52.0 | 8 | 14 | 81.5 | 8 | 14 | 56.0 | 7 | 6.5 | 6 | 7 | 39.5 | 123 | 135 | 147 | 8 | 7 | 75.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | |
| 28 FT | 30 | 32 | 11 | 8 | 7 | 6 | 6 | 7 | 44.9 | 54.0 | 54.0 | 54.0 | 8 | 14 | 80.5 | 8 | 14 | 56.0 | 7 | 6.5 | 6 | 6.5 | 39.6 | 124 | 136 | 148 | 8 | 7 | 75.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | |
| 30 FT | 31 | 34 | 11 | 8 | 8 | 7.5 | 6 | 6 | 44.9 | 55.0 | 55.0 | 55.0 | 8 | 14 | 79.5 | 8 | 14 | 55.5 | 7 | 6.5 | 6 | 6 | 39.6 | 126 | 138 | 150 | 8 | 6.5 | 75.0 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 32 FT | 32 | 35 | 12 | 8 | 8 | 7 | 6 | 7 | 45.8 | 56.0 | 56.0 | 56.0 | 8 | 14 | 78.5 | 8 | 14 | 55.0 | 7 | 6 | 6 | 6.5 | 40.0 | 127 | 139 | 151 | 8 | 6.5 | 75.0 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 34 FT | 33 | 36 | 12 | 8 | 8 | 7 | 6 | 7 | 45.3 | 57.0 | 57.0 | 57.0 | 8 | 14 | 77.5 | 8 | 14 | 54.5 | 7 | 6 | 6 | 6.5 | 39.3 | 128 | 140 | 152 | 8 | 6 | 75.0 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 36 FT | 35 | 38 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 45.3 | 59.0 | 59.0 | 59.0 | 8 | 13 | 75.0 | 8 | 13 | 52.0 | 7 | 6 | 6 | 6 | 39.3 | 130 | 142 | 154 | 8 | 6 | 75.0 | 5 | 12 | 5 | 7 | 0 | | | | | |
| 38 FT | 36 | 39 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 45.3 | 60.0 | 60.0 | 60.0 | 8 | 13 | 74.0 | 8 | 13 | 51.5 | 7 | 6 | 6 | 6 | 39.3 | 131 | 143 | 155 | 8 | 6 | 75.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | |
| 40 FT | 37 | 41 | 12 | 8 | 8 | 6.5 | 6 | 6 | 45.3 | 61.0 | 61.0 | 61.0 | 8 | 12 | 73.5 | 8 | 12 | 50.5 | 7 | 6 | 7 | 6.5 | 42.5 | 133 | 145 | 157 | 9 | 7 | 80.5 | 5 | 11 | 5 | 6 | 0 | | | | | |
| 42 FT | 38 | 42 | 12 | 8 | 8 | 6 | 6 | 6 | 45.3 | 62.0 | 62.0 | 62.0 | 8 | 12 | 73.0 | 8 | 12 | 50.0 | 7 | 6 | 7 | 6 | 42.6 | 134 | 146 | 158 | 9 | 7 | 80.5 | 5 | 7 | 6 | 8 | 0 | | | | | |
| 44 FT | 39 | 43 | 13 | 9 | 8 | 6 | 6 | 6 | 45.8 | 63.0 | 63.0 | 63.0 | 8 | 12 | 73.5 | 8 | 12 | 50.5 | 8 | 7.5 | 7 | 6.5 | 43.1 | 135 | 147 | 159 | 9 | 7 | 81.0 | 5 | 12 | 5 | 6 | 0 | | | | | |
| 46 FT | 40 | 44 | 13 | 9 | 8 | 6 | 7 | 7 | 50.8 | 70.0 | 70.0 | 70.0 | 8 | 12 | 73.0 | 8 | 12 | 49.5 | 8 | 7.5 | 7 | 6.5 | 43.4 | 136 | 148 | 160 | 9 | 6.5 | 80.5 | 5 | 12 | 6 | 8 | 0 | | | | | |
| 48 FT | 41 | 45 | 13 | 9 | 9 | 7.5 | 7 | 7 | 50.8 | 71.0 | 71.0 | 71.0 | 9 | 15 | 80.5 | 9 | 15 | 56.5 | 8 | 7 | 7 | 6.5 | 43.5 | 137 | 149 | 161 | 9 | 6.5 | 80.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | |
| 50 FT | 42 | 46 | 13 | 9 | 9 | 7 | 7 | 6.5 | 50.8 | 72.0 | 72.0 | 72.0 | 9 | 14 | 80.0 | 9 | 14 | 56.0 | 8 | 7 | 7 | 6 | 43.8 | 138 | 150 | 162 | 9 | 6.5 | 80.5 | 5 | 9.5 | 6 | 7 | 0 | | | | | |

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|---------|------|------|---------|------|------------------|---------|------|---------|----|--------|--------|--------|---------|------|----|---------|-----------|---------|------|---------------------------------------|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | H1 BARS | | | H2 BARS | | | A2 BARS | | J4 BARS | | | | | H3 BARS | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 13 | 9 | 10 | 6 | 7.5 | 5 | 6 | 77.5 | 35.0 | 35.0 | 35.0 | 6 | 15 | 155.5 | 6 | 15 | 53.5 | 5 | 6 | 6 | 6 | 89.5 | 141 | 153 | 165 | 6 | 6 | 70.0 | 5 | 11.5 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 17 | 14 | 9 | 10 | 6 | 7.5 | 5 | 6.5 | 77.5 | 37.0 | 37.0 | 37.0 | 6 | 14 | 155.5 | 6 | 14 | 50.0 | 6 | 8 | 6 | 6.5 | 79.8 | 142 | 154 | 166 | 6 | 6 | 69.5 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 13 | 13 | 10 | 10 | 6 | 6.5 | 6 | 7 | 76.9 | 33.0 | 37.0 | 37.0 | 7 | 15 | 96.5 | 7 | 15 | 46.0 | 5 | 6 | 6 | 6.5 | 70.0 | 141 | 153 | 165 | 7 | 6 | 71.5 | 5 | 11 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 13 | 14 | 10 | 10 | 6 | 7 | 6 | 7 | 65.3 | 33.0 | 37.0 | 37.0 | 7 | 13 | 79.5 | 7 | 13 | 44.0 | 6 | 8 | 6 | 6.5 | 64.5 | 142 | 154 | 166 | 7 | 6 | 71.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 14 | 16 | 10 | 10 | 6 | 7 | 6 | 6.5 | 60.3 | 34.0 | 34.0 | 38.0 | 7 | 13 | 75.0 | 7 | 13 | 43.0 | 6 | 7 | 6 | 7 | 60.6 | 144 | 156 | 168 | 7 | 6 | 70.5 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 16 | 17 | 10 | 10 | 6 | 7 | 6 | 6.5 | 63.1 | 36.0 | 40.0 | 40.0 | 7 | 13 | 81.5 | 7 | 13 | 51.0 | 6 | 7 | 6 | 6.5 | 57.8 | 145 | 157 | 169 | 7 | 6 | 70.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 17 | 19 | 11 | 10 | 6 | 7 | 6 | 6.5 | 62.3 | 37.0 | 37.0 | 41.0 | 7 | 12 | 80.0 | 7 | 12 | 50.5 | 6 | 6 | 6 | 7.5 | 56.5 | 147 | 159 | 171 | 7 | 6 | 70.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 19 | 21 | 12 | 10 | 6 | 6.5 | 6 | 7 | 61.5 | 39.0 | 39.0 | 43.0 | 7 | 12 | 78.5 | 7 | 12 | 50.5 | 7 | 8 | 6 | 8 | 55.8 | 149 | 161 | 173 | 7 | 6 | 70.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 20 | 22 | 12 | 10 | 6 | 6.5 | 6 | 6.5 | 60.3 | 40.0 | 40.0 | 44.0 | 7 | 12 | 78.0 | 7 | 12 | 50.0 | 7 | 7.5 | 6 | 7 | 54.6 | 150 | 162 | 174 | 7 | 6 | 70.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 22 | 24 | 12 | 10 | 6 | 6 | 6 | 6 | 59.3 | 42.0 | 46.0 | 46.0 | 7 | 12 | 77.0 | 7 | 12 | 50.0 | 7 | 7 | 6 | 6.5 | 54.0 | 152 | 164 | 176 | 7 | 6 | 69.5 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 23 | 25 | 13 | 10 | 7 | 7.5 | 6 | 6 | 59.1 | 43.0 | 43.0 | 47.0 | 8 | 15 | 84.5 | 8 | 15 | 57.5 | 7 | 6.5 | 6 | 7 | 53.6 | 153 | 165 | 177 | 8 | 7 | 75.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 25 | 27 | 13 | 10 | 7 | 7 | 6 | 6 | 58.4 | 45.0 | 45.0 | 49.0 | 8 | 15 | 83.5 | 8 | 15 | 57.5 | 7 | 6.5 | 6 | 7 | 53.1 | 155 | 167 | 179 | 8 | 7 | 75.5 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 27 | 29 | 14 | 10 | 7 | 6.5 | 6 | 6 | 58.6 | 51.0 | 51.0 | 51.0 | 8 | 15 | 82.5 | 8 | 15 | 57.0 | 7 | 6.5 | 6 | 7.5 | 53.3 | 157 | 169 | 181 | 8 | 7 | 75.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 28 | 31 | 14 | 10 | 7 | 6.5 | 6 | 6 | 58.3 | 52.0 | 52.0 | 52.0 | 8 | 14 | 82.0 | 8 | 14 | 57.0 | 7 | 6.5 | 6 | 7.5 | 52.9 | 159 | 171 | 183 | 8 | 7 | 75.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 30 | 33 | 15 | 10 | 7 | 6 | 6 | 6 | 58.8 | 54.0 | 54.0 | 54.0 | 8 | 15 | 80.5 | 8 | 15 | 56.5 | 7 | 6.5 | 6 | 7 | 53.3 | 161 | 173 | 185 | 8 | 6.5 | 75.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 31 | 34 | 15 | 10 | 8 | 7.5 | 7 | 8 | 63.5 | 55.0 | 55.0 | 55.0 | 8 | 15 | 79.5 | 8 | 15 | 56.0 | 7 | 6 | 6 | 7 | 53.1 | 162 | 174 | 186 | 8 | 6.5 | 75.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 32 | 35 | 15 | 10 | 8 | 7.5 | 7 | 7 | 63.3 | 56.0 | 56.0 | 56.0 | 8 | 14 | 79.0 | 8 | 14 | 55.5 | 7 | 6 | 6 | 6.5 | 53.0 | 163 | 175 | 187 | 8 | 6.5 | 75.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 33 | 37 | 16 | 10 | 8 | 7 | 7 | 7.5 | 64.0 | 57.0 | 57.0 | 57.0 | 8 | 14 | 77.5 | 8 | 14 | 55.0 | 7 | 6 | 6 | 6.5 | 53.5 | 165 | 177 | 189 | 8 | 6 | 75.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 34 | 38 | 16 | 10 | 8 | 7 | 7 | 7.5 | 62.4 | 58.0 | 58.0 | 58.0 | 8 | 14 | 76.5 | 8 | 14 | 54.0 | 7 | 6 | 6 | 6 | 51.9 | 166 | 178 | 190 | 8 | 6 | 75.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 35 | 40 | 16 | 10 | 8 | 6.5 | 7 | 7 | 62.4 | 59.0 | 59.0 | 59.0 | 8 | 13 | 75.0 | 8 | 13 | 53.5 | 7 | 6 | 6 | 6 | 52.0 | 168 | 180 | 192 | 9 | 7 | 81.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 36 | 41 | 17 | 10 | 8 | 6 | 7 | 7.5 | 63.1 | 60.0 | 60.0 | 66.0 | 8 | 12 | 74.5 | 8 | 12 | 52.5 | 8 | 7.5 | 7 | 8 | 55.5 | 169 | 181 | 193 | 9 | 7 | 81.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 38 | 42 | 17 | 10 | 8 | 6 | 7 | 7.5 | 62.9 | 62.0 | 62.0 | 68.0 | 8 | 12 | 73.5 | 8 | 12 | 50.0 | 8 | 7.5 | 7 | 7.5 | 55.8 | 170 | 182 | 194 | 9 | 7 | 81.5 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 39 | 43 | 18 | 10 | 8 | 6 | 7 | 7.5 | 63.8 | 63.0 | 63.0 | 69.0 | 8 | 12 | 73.0 | 8 | 12 | 49.0 | 8 | 7 | 7 | 7.5 | 56.1 | 171 | 183 | 195 | 9 | 7 | 81.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 40 | 44 | 18 | 10 | 8 | 6 | 7 | 7.5 | 63.6 | 70.0 | 70.0 | 70.0 | 8 | 12 | 72.0 | 8 | 12 | 48.5 | 8 | 6.5 | 7 | 7 | 56.3 | 172 | 184 | 196 | 9 | 6.5 | 81.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 40 | 46 | 19 | 10 | 8 | 6 | 7 | 7 | 64.8 | 70.0 | 70.0 | 70.0 | 8 | 12 | 72.0 | 8 | 12 | 49.0 | 8 | 7 | 7 | 7 | 56.6 | 174 | 186 | 198 | 9 | 6.5 | 81.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 41 | 47 | 19 | 10 | 9 | 7.5 | 7 | 6.5 | 64.6 | 71.0 | 71.0 | 71.0 | 8 | 12 | 71.5 | 8 | 12 | 48.5 | 8 | 7 | 7 | 6.5 | 56.9 | 175 | 187 | 199 | 9 | 6 | 81.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|--------|---------|--------|---------|------|---------|-------|---------|------|------------------|------|---------|------|---------|--------|---------|--------|------|------|-----------|------|------|---------------------------------------|------|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | H2 BARS | | A2 BARS | | J4 BARS | | | | H3 BARS | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | HT=14' | HT=15' | HT=16' | SIZE | SPA. | C5 | SIZE | SPA. | C6 | SIZE | SPA. | SIZE | SPA. | C4 | HT=14' | HT=15' | HT=16' | SIZE | SPA. | C7 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | 1 FT | 15 | 13 | 12 | 13 | 6 | 7.5 | 6 | 8 | 82.9 | 35.0 | 35.0 | 39.0 | 6 | 15 | 160.5 | 6 | 15 | 53.0 | 5 | 6 | 6 | 7 | 101.1 | 177 | 189 | 201 | 6 | 6 | 70.5 | 5 | 10 | 5 | 7 | 12 | | | | | | | | | | | | | | |
| 2 FT | 17 | 14 | 12 | 13 | 6 | 7.5 | 6 | 8.5 | 82.9 | 37.0 | 37.0 | 41.0 | 6 | 14 | 160.5 | 6 | 14 | 50.0 | 6 | 8 | 6 | 7 | 95.1 | 178 | 190 | 202 | 7 | 7 | 73.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 13 | 13 | 12 | 13 | 6 | 7 | 6 | 7 | 99.8 | 37.0 | 37.0 | 37.0 | 7 | 15 | 94.0 | 7 | 15 | 46.0 | 6 | 8.5 | 6 | 6 | 86.1 | 177 | 189 | 201 | 7 | 6 | 72.0 | 5 | 11 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 13 | 15 | 12 | 13 | 6 | 7 | 6 | 6.5 | 82.6 | 37.0 | 37.0 | 37.0 | 7 | 14 | 77.5 | 7 | 14 | 44.5 | 6 | 7.5 | 6 | 6.5 | 82.5 | 179 | 191 | 203 | 7 | 6 | 71.5 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 14 | 16 | 13 | 13 | 6 | 7.5 | 6 | 6.5 | 76.6 | 38.0 | 38.0 | 38.0 | 7 | 13 | 74.5 | 7 | 13 | 44.0 | 6 | 7 | 6 | 6.5 | 77.6 | 180 | 192 | 204 | 7 | 6 | 71.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 15 | 18 | 13 | 13 | 6 | 6.5 | 6 | 6 | 79.5 | 39.0 | 39.0 | 39.0 | 7 | 13 | 80.5 | 7 | 13 | 51.5 | 6 | 6.5 | 6 | 6 | 75.6 | 182 | 194 | 206 | 7 | 6 | 71.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 17 | 19 | 14 | 13 | 6 | 7 | 6 | 6 | 77.8 | 41.0 | 41.0 | 41.0 | 7 | 13 | 79.5 | 7 | 13 | 51.5 | 6 | 6 | 6 | 6 | 73.1 | 183 | 195 | 207 | 7 | 6 | 70.5 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 18 | 21 | 15 | 13 | 6 | 7 | 6 | 6 | 76.3 | 42.0 | 42.0 | 42.0 | 7 | 12 | 78.5 | 7 | 12 | 51.0 | 7 | 8 | 6 | 6 | 71.8 | 185 | 197 | 209 | 7 | 6 | 70.5 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 20 | 22 | 15 | 13 | 6 | 6.5 | 7 | 7.5 | 79.9 | 44.0 | 44.0 | 44.0 | 7 | 12 | 78.0 | 7 | 12 | 51.0 | 7 | 7.5 | 6 | 6 | 70.3 | 186 | 198 | 210 | 7 | 6 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 22 | 24 | 15 | 13 | 6 | 6 | 7 | 7 | 78.8 | 46.0 | 46.0 | 52.0 | 7 | 12 | 77.5 | 7 | 12 | 51.0 | 7 | 7 | 7 | 7 | 72.4 | 188 | 200 | 212 | 7 | 6 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 23 | 25 | 16 | 13 | 7 | 7.5 | 7 | 7 | 78.0 | 47.0 | 47.0 | 53.0 | 8 | 15 | 85.0 | 8 | 15 | 58.5 | 7 | 6 | 7 | 7.5 | 71.4 | 189 | 201 | 213 | 8 | 7 | 76.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 25 | 27 | 17 | 13 | 7 | 7 | 7 | 7.5 | 77.8 | 49.0 | 49.0 | 49.0 | 7 | 12 | 76.0 | 7 | 12 | 50.5 | 7 | 6 | 6 | 6 | 68.0 | 191 | 203 | 215 | 8 | 7 | 76.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 26 | 29 | 17 | 13 | 7 | 7 | 7 | 7 | 76.9 | 50.0 | 50.0 | 56.0 | 8 | 15 | 83.5 | 8 | 15 | 58.5 | 7 | 6.5 | 7 | 7.5 | 70.4 | 193 | 205 | 217 | 8 | 7 | 76.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 28 | 31 | 18 | 13 | 7 | 6.5 | 7 | 7 | 76.9 | 52.0 | 52.0 | 52.0 | 8 | 15 | 82.5 | 8 | 15 | 58.0 | 7 | 6.5 | 6 | 6 | 67.1 | 195 | 207 | 219 | 8 | 7 | 76.5 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 29 | 33 | 19 | 13 | 7 | 6 | 7 | 7 | 77.1 | 53.0 | 53.0 | 53.0 | 8 | 15 | 82.0 | 8 | 15 | 58.0 | 7 | 6 | 6 | 6 | 67.1 | 197 | 209 | 221 | 8 | 6.5 | 76.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 31 | 34 | 19 | 13 | 8 | 7.5 | 7 | 6.5 | 76.8 | 55.0 | 55.0 | 55.0 | 8 | 15 | 80.5 | 8 | 15 | 57.0 | 7 | 6 | 6 | 6 | 67.0 | 198 | 210 | 222 | 8 | 6.5 | 76.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 32 | 36 | 20 | 13 | 8 | 7.5 | 7 | 6.5 | 77.3 | 56.0 | 56.0 | 56.0 | 8 | 14 | 79.5 | 8 | 14 | 56.5 | 7 | 6 | 6 | 6 | 67.3 | 200 | 212 | 224 | 8 | 6 | 76.5 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 33 | 37 | 21 | 13 | 8 | 7 | 7 | 6.5 | 77.6 | 57.0 | 57.0 | 57.0 | 8 | 14 | 78.5 | 8 | 14 | 55.5 | 7 | 6 | 6 | 6 | 67.3 | 201 | 213 | 225 | 8 | 6 | 76.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 34 | 38 | 21 | 13 | 8 | 7 | 7 | 6.5 | 75.5 | 58.0 | 58.0 | 58.0 | 8 | 14 | 77.5 | 8 | 14 | 55.0 | 8 | 7 | 6 | 6 | 64.9 | 202 | 214 | 226 | 8 | 6 | 76.5 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 35 | 40 | 21 | 13 | 8 | 6.5 | 7 | 6 | 75.5 | 59.0 | 59.0 | 59.0 | 8 | 13 | 76.5 | 8 | 13 | 54.0 | 8 | 7.5 | 6 | 6 | 65.1 | 204 | 216 | 228 | 9 | 7 | 82.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 36 | 41 | 22 | 13 | 8 | 6.5 | 7 | 6 | 76.1 | 66.0 | 66.0 | 66.0 | 8 | 13 | 75.5 | 8 | 13 | 53.5 | 8 | 7.5 | 7 | 7.5 | 68.5 | 205 | 217 | 229 | 9 | 7 | 82.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 37 | 42 | 23 | 13 | 8 | 6.5 | 7 | 6.5 | 76.9 | 67.0 | 67.0 | 67.0 | 8 | 12 | 75.0 | 8 | 12 | 52.5 | 8 | 6.5 | 7 | 7.5 | 68.8 | 206 | 218 | 230 | 9 | 7 | 82.5 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 38 | 44 | 24 | 13 | 8 | 6 | 7 | 6 | 77.6 | 68.0 | 68.0 | 68.0 | 8 | 12 | 74.5 | 8 | 12 | 52.0 | 8 | 7 | 7 | 7 | 69.4 | 208 | 220 | 232 | 9 | 6.5 | 82.5 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 39 | 45 | 25 | 13 | 8 | 6 | 7 | 6 | 78.4 | 69.0 | 69.0 | 69.0 | 8 | 12 | 74.0 | 8 | 12 | 51.0 | 8 | 7 | 7 | 7 | 69.8 | 209 | 221 | 233 | 9 | 6.5 | 82.5 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 40 | 46 | 26 | 13 | 8 | 6 | 7 | 6 | 79.1 | 70.0 | 70.0 | 70.0 | 8 | 12 | 73.5 | 8 | 12 | 50.0 | 8 | 6.5 | 7 | 7 | 70.1 | 210 | 222 | 234 | 9 | 6.5 | 82.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 41 | 47 | 27 | 13 | 9 | 7.5 | 7 | 6 | 79.9 | 71.0 | 71.0 | 71.0 | 8 | 12 | 73.0 | 8 | 12 | 49.5 | 8 | 6 | 7 | 6.5 | 70.5 | 211 | 223 | 235 | 9 | 6 | 82.5 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS. AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



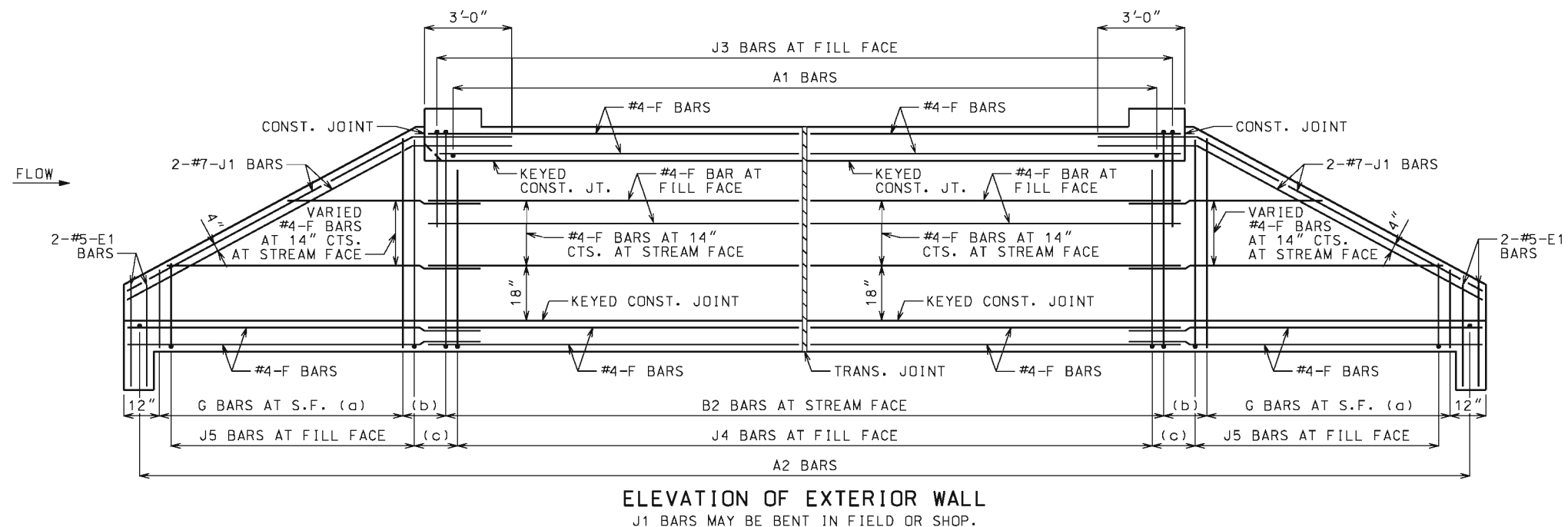
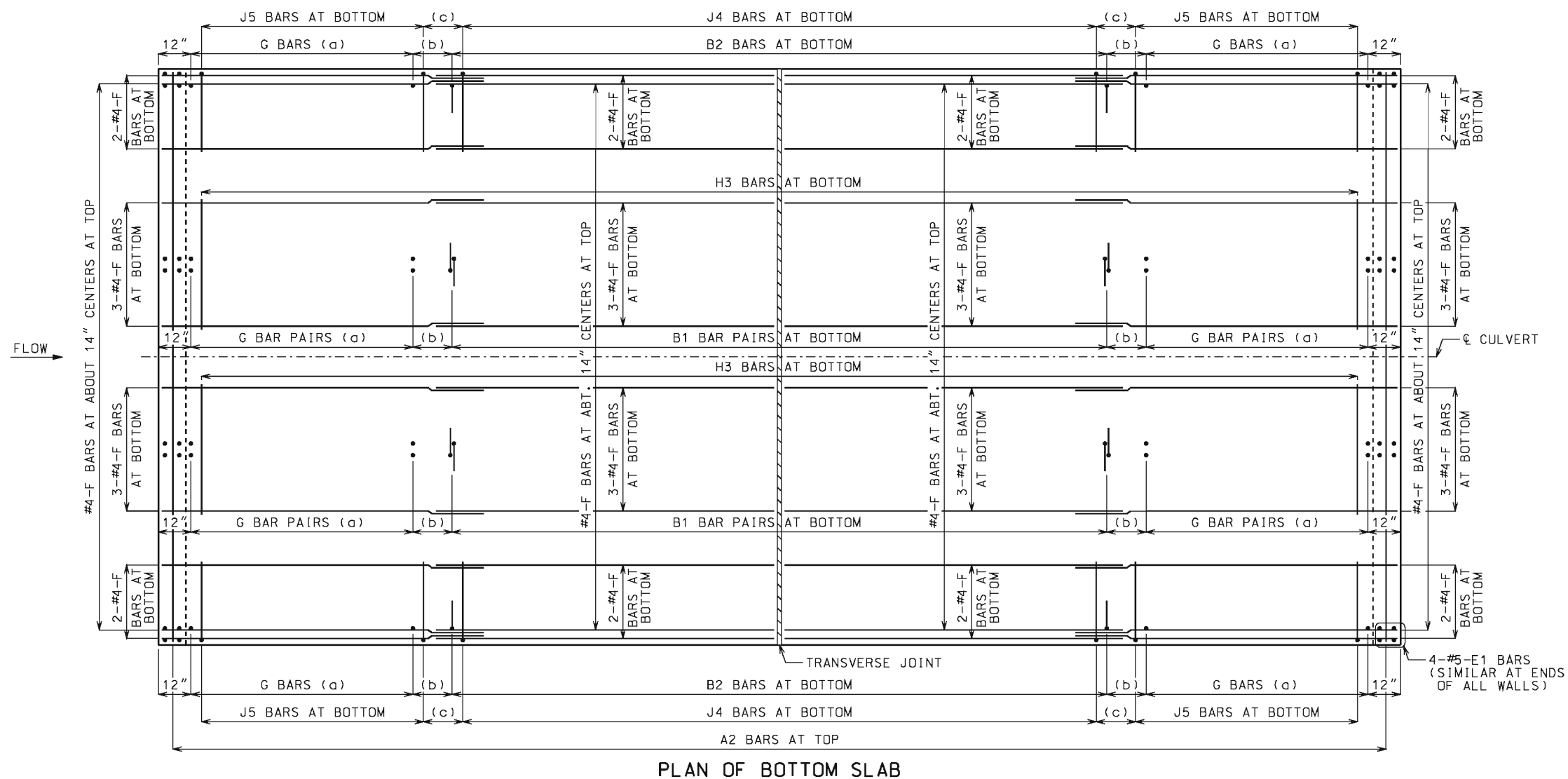
**CONCRETE
DOUBLE BOX CULVERT**
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 16 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 10/01/2011
DATE PREPARED: 9/8/2011

703.47

SHEET NO.
27 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

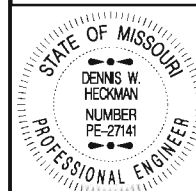
(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

**CONCRETE
TRIPLE BOX CULVERT**

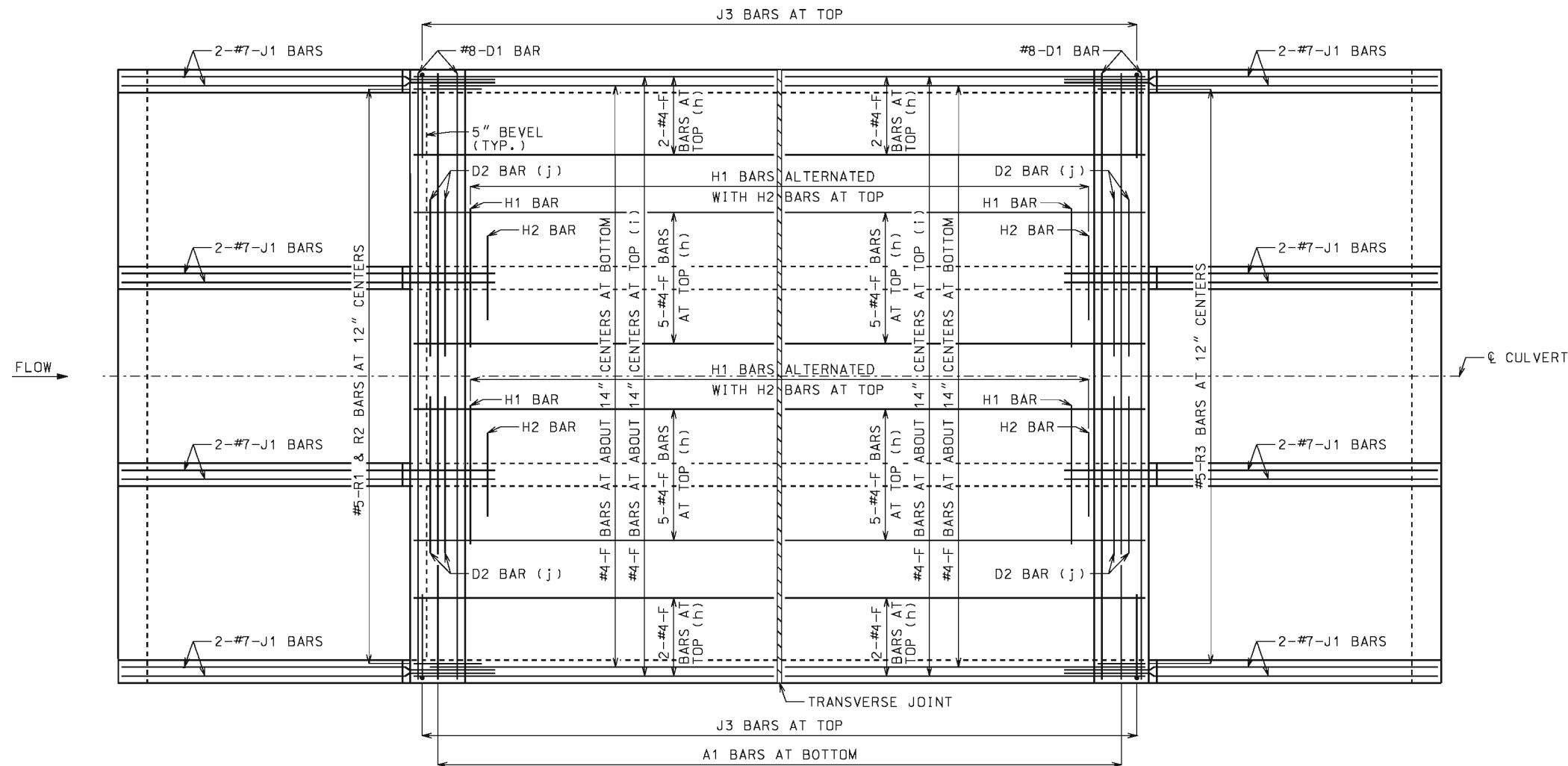
**SKEW: SQUARED
WINGS: STRAIGHT**

REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

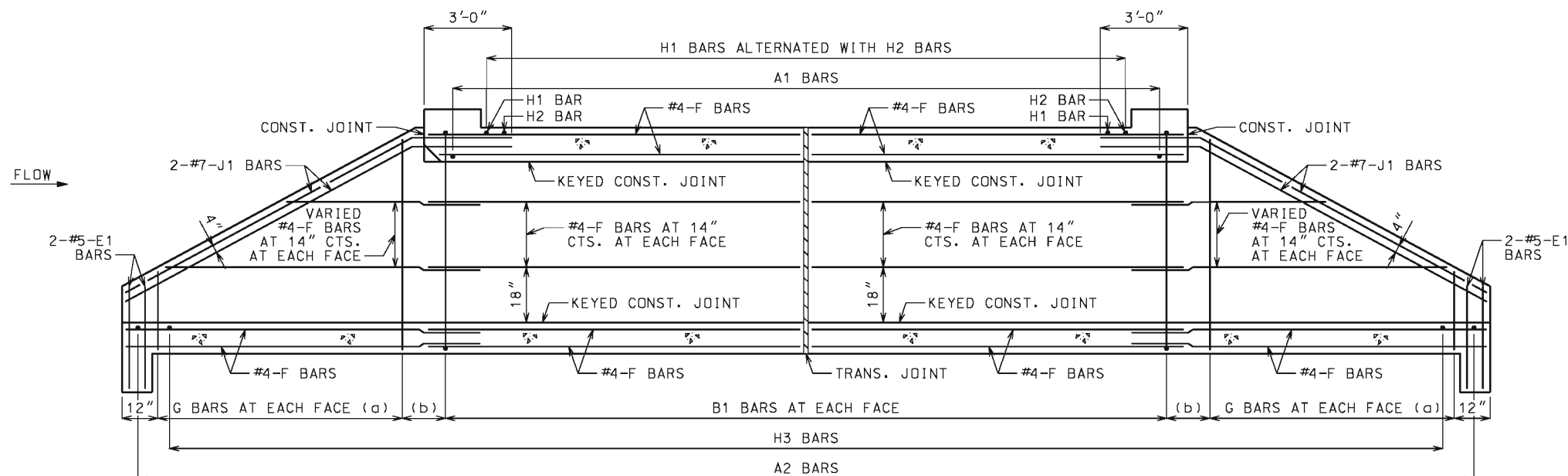
703.80H

SHEET NO.
1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) NOT SPECIFIED ON THIS SHEET

(e) NOT SPECIFIED ON THIS SHEET

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET


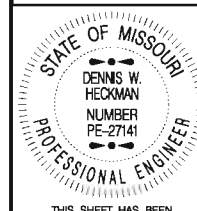
(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

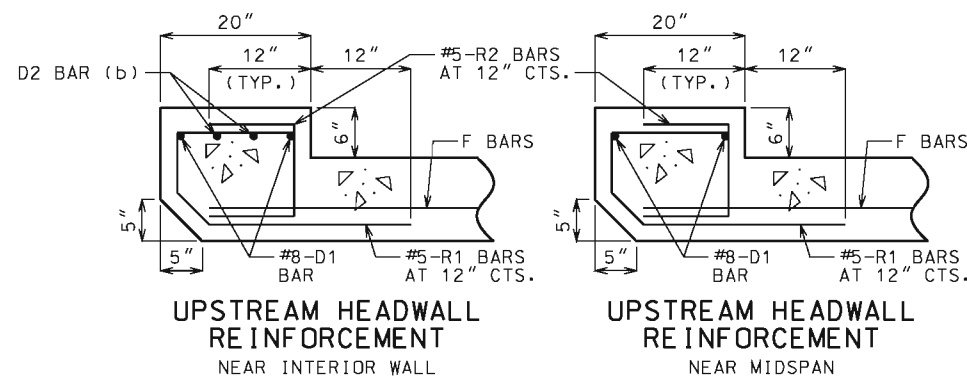
IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

| | |
|---|---|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>CONCRETE TRIPLE BOX CULVERT</p> <p>SKEW: SQUARED WINGS: STRAIGHT</p> <p>REINFORCEMENT</p> |
| <p>DATE EFFECTIVE: <u>12/01/2011</u></p> <p>DATE PREPARED: <u>5/13/2015</u></p> | <p>703.80H</p> |
| <p>SHEET NO. 2 OF 3</p> | |



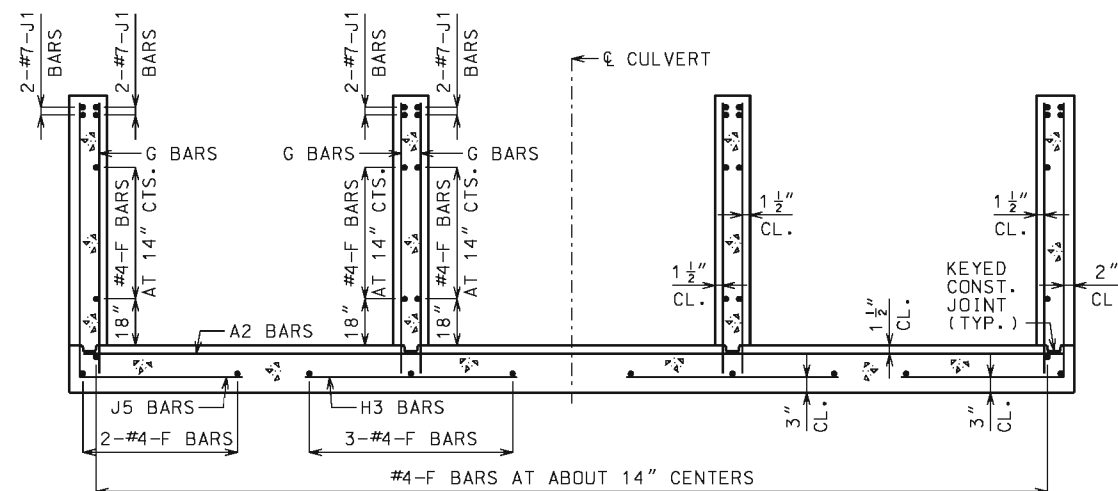
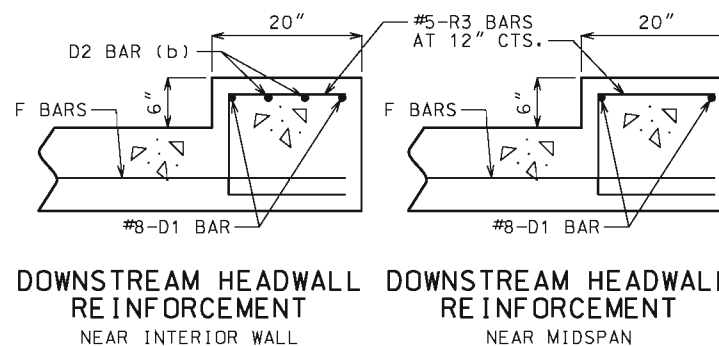
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

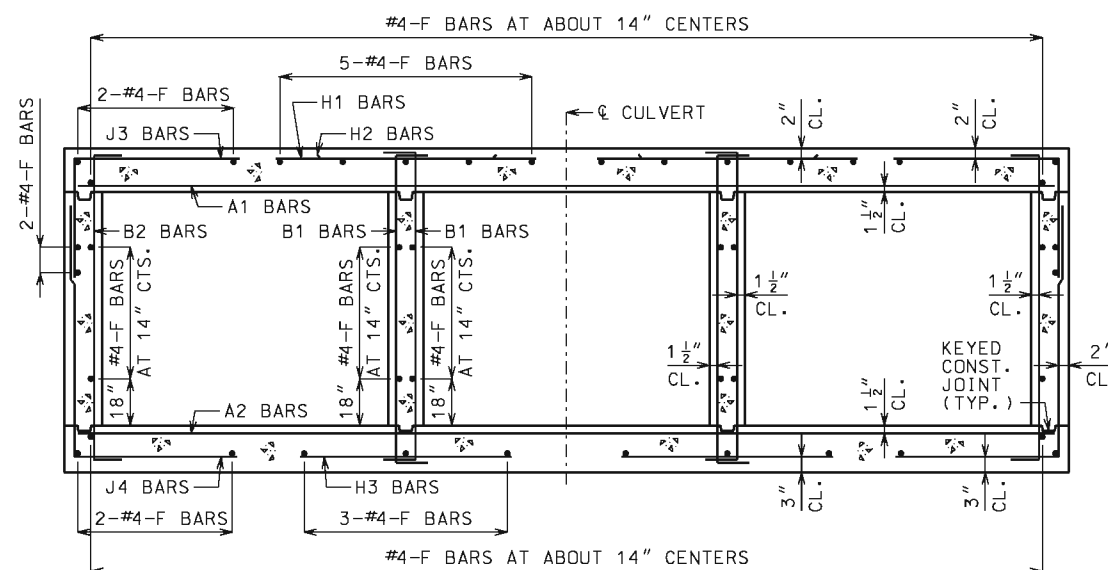


(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0''$
 #8 FOR CLEAR SPAN $> 10'-0''$
 #9 FOR CLEAR SPAN $> 13'-0''$

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

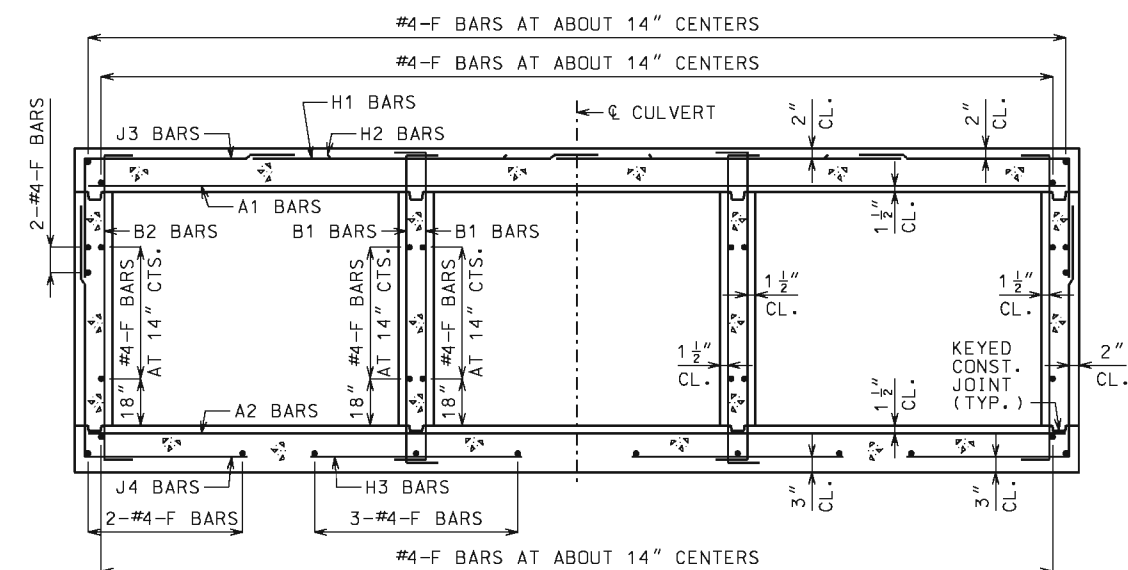


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

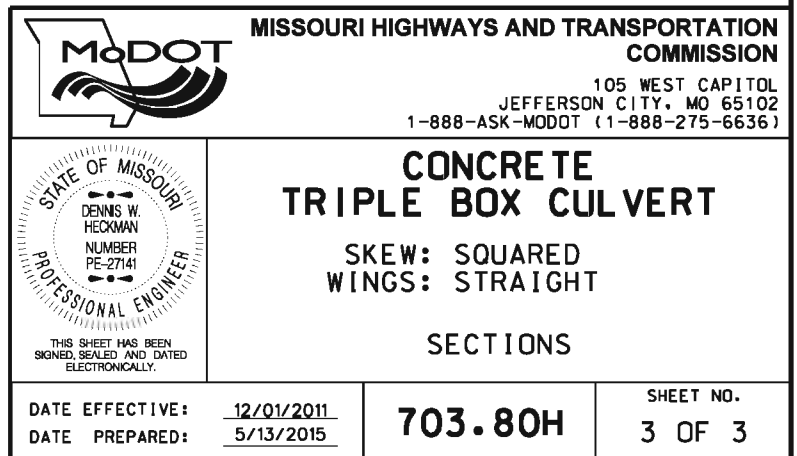
GENERAL NOTES:

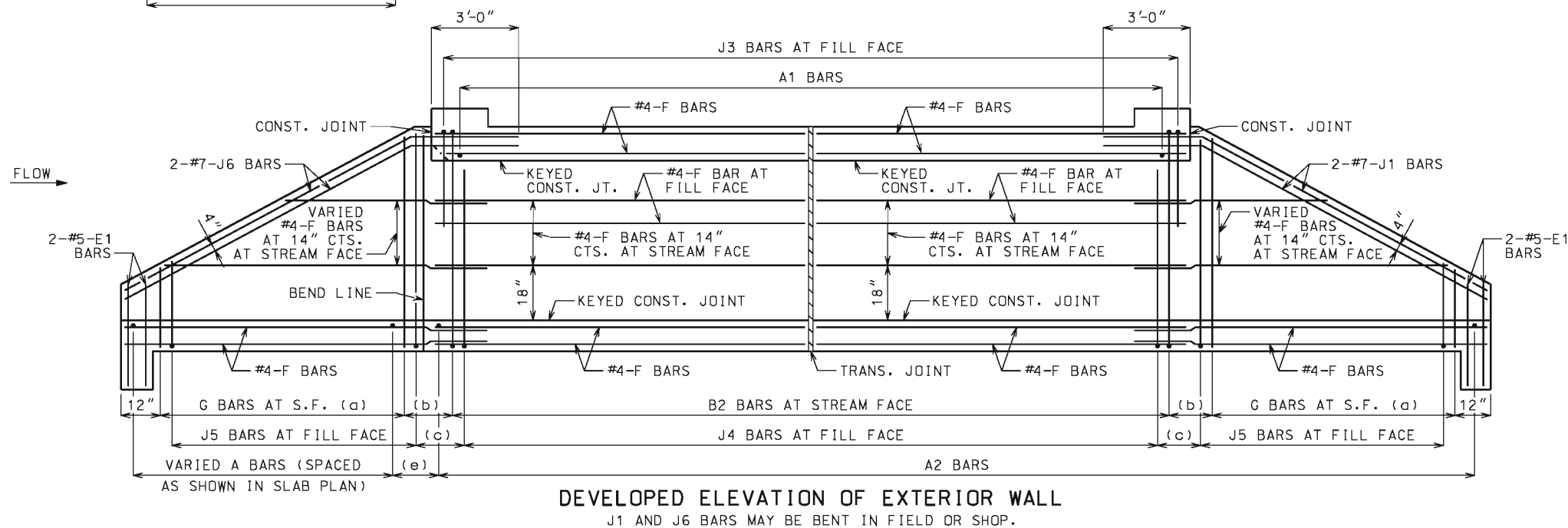
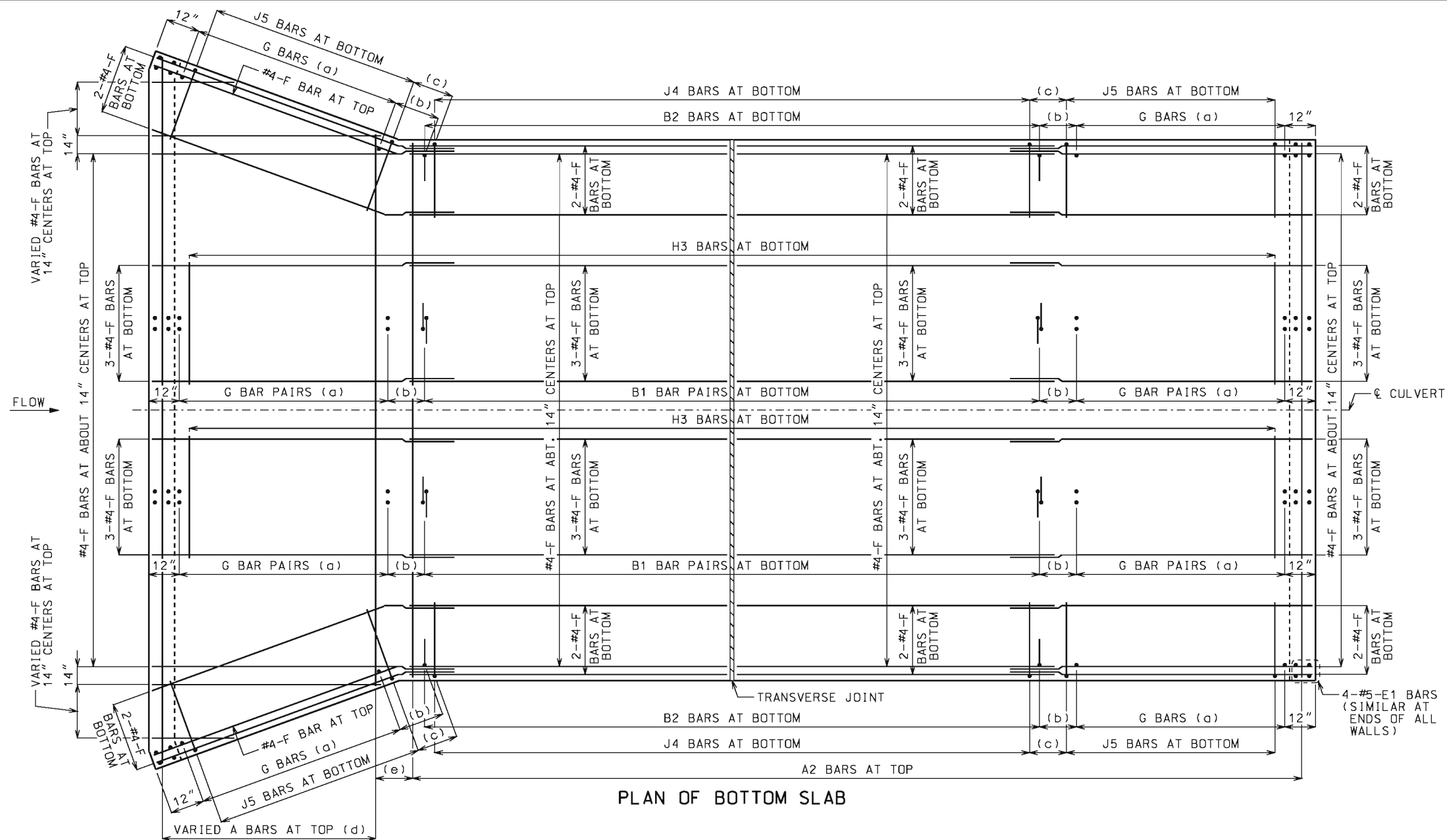
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".





LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

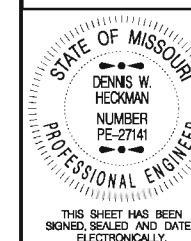
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MDOT (1-888-275-6636)



**CONCRETE
TRIPLE BOX CULVERT**

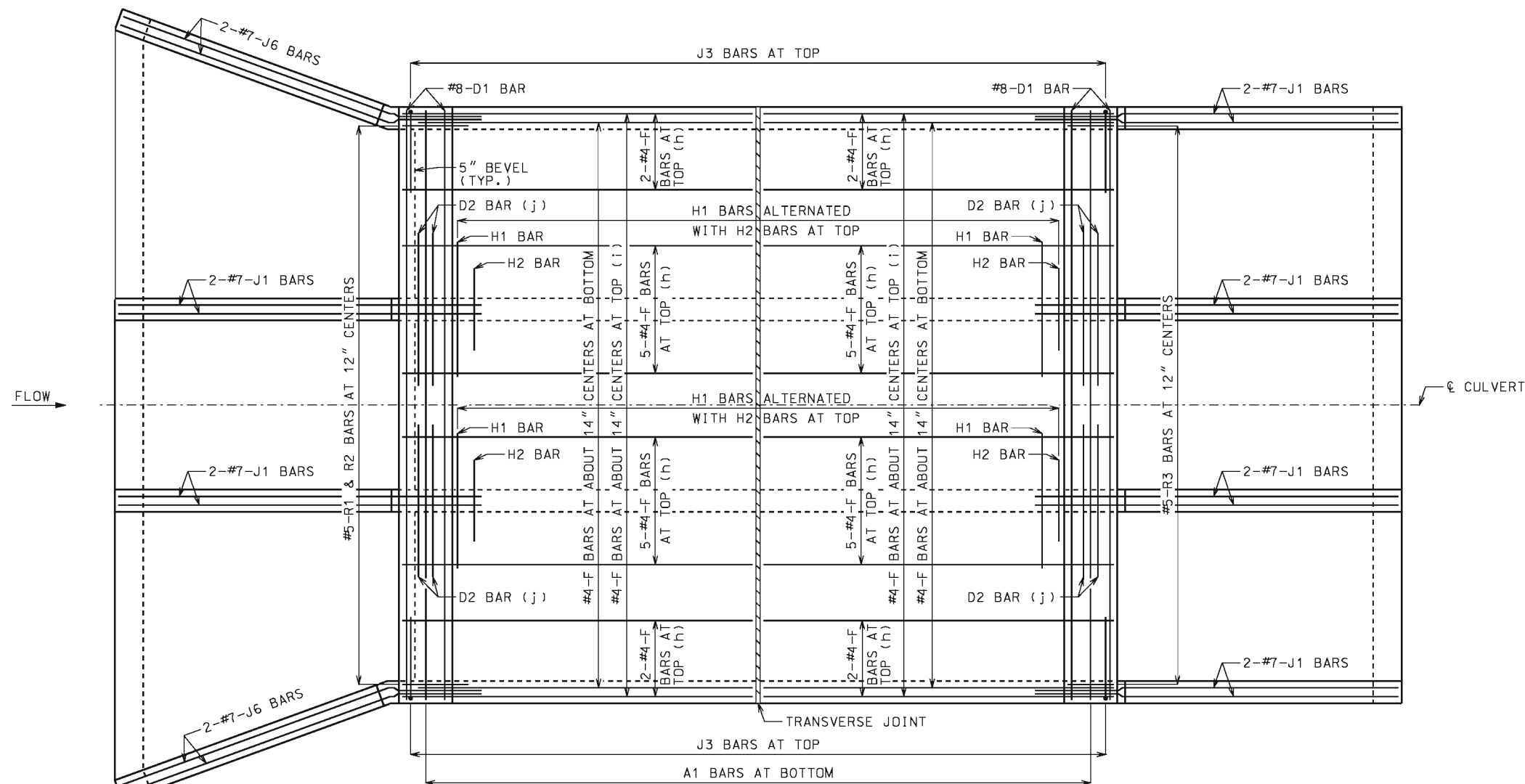
**SKEW: SQUARED
WINGS: FLARED**

REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

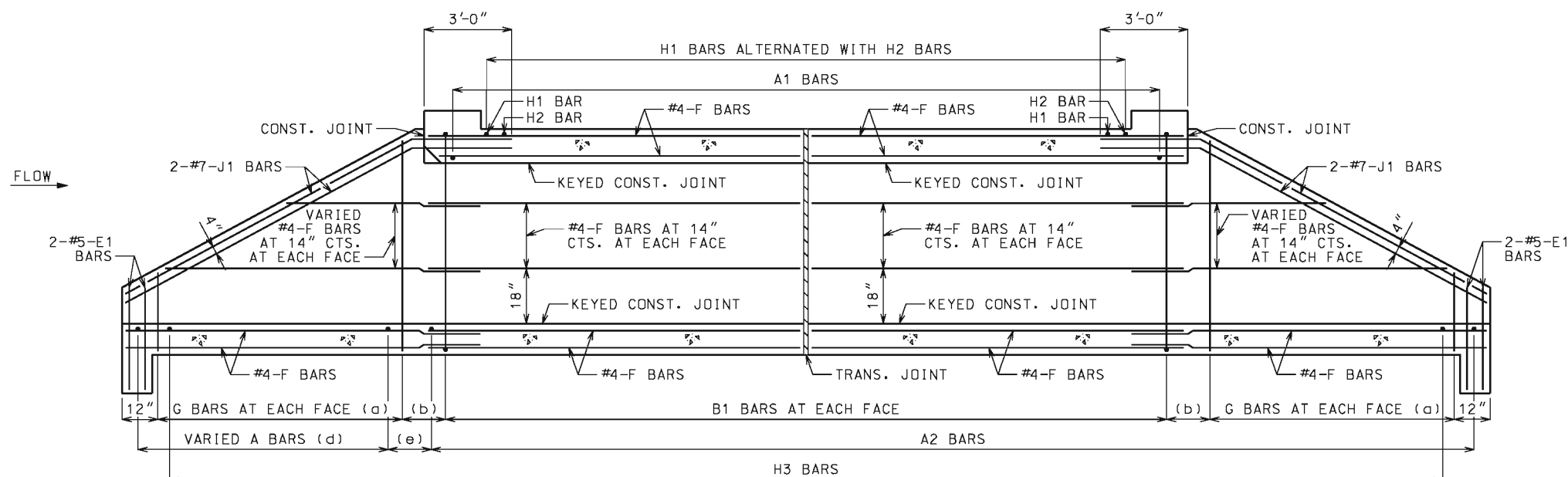
703.81H

SHEET NO.
1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2\".

LAP LONGITUDINAL BARS A MINIMUM OF 23\" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12\" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) NOT SPECIFIED ON THIS SHEET

(g) NOT SPECIFIED ON THIS SHEET


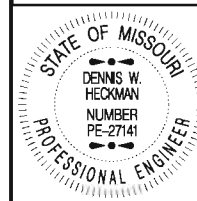
(h) FOR DESIGN FILLS OVER 2'-0\"

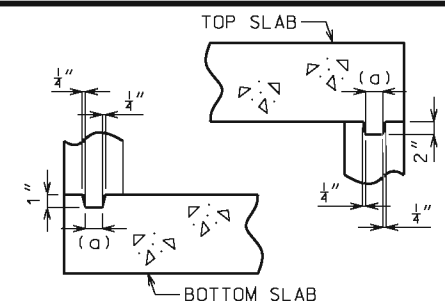
(i) FOR DESIGN FILLS 2'-0\" OR LESS

(j) NOT REQUIRED FOR CLEAR SPANS ≤ 10'-0\"

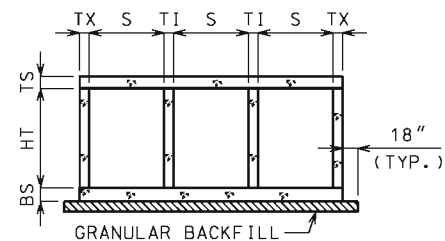
#8 FOR CLEAR SPAN > 10'-0\"
#9 FOR CLEAR SPAN > 13'-0\"

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR 1/4 CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

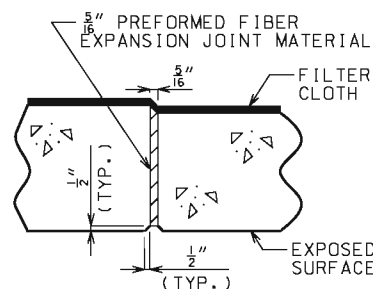
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE TRIPLE BOX CULVERT SKEW: SQUARED WINGS: FLARED |
| | REINFORCEMENT |
| DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015 | 703.81H |
| SHEET NO. 2 OF 3 | |



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



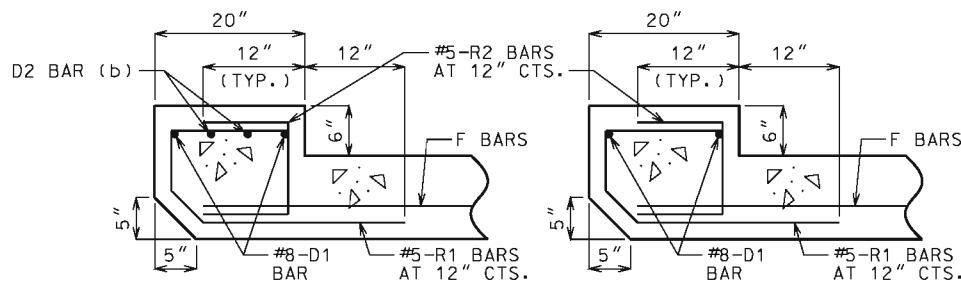
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

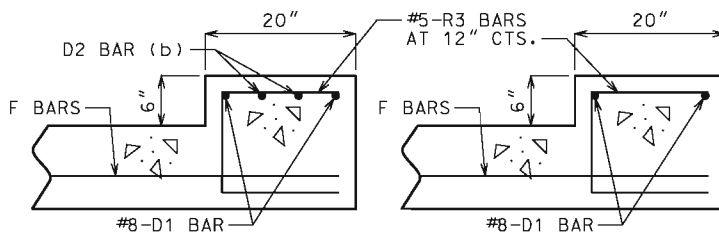
PERFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

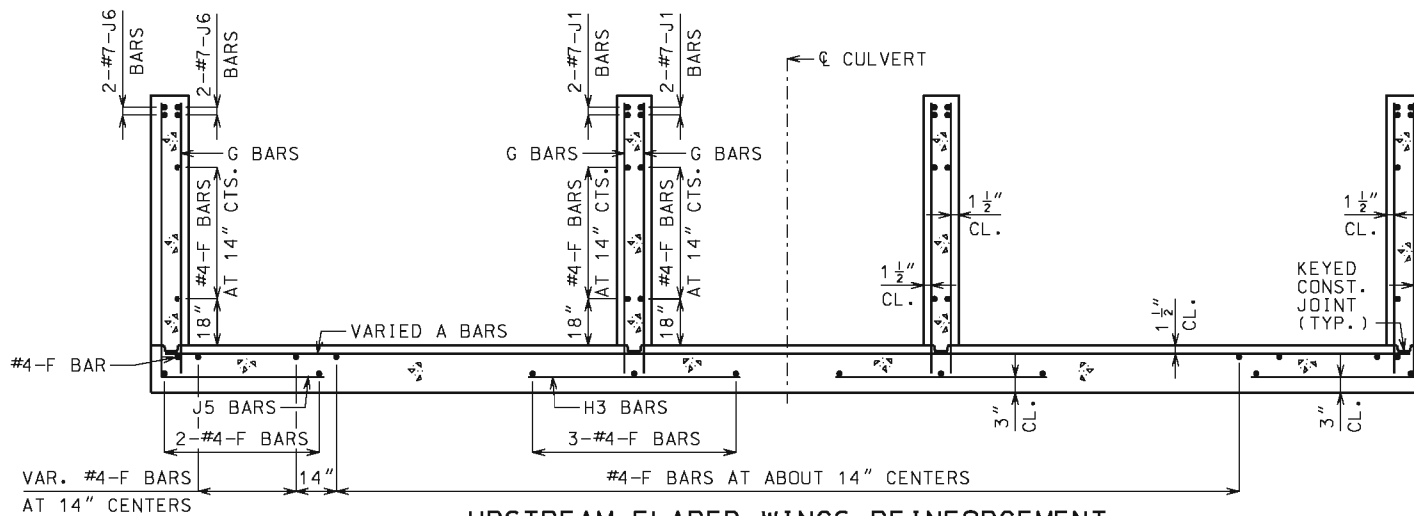


DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL

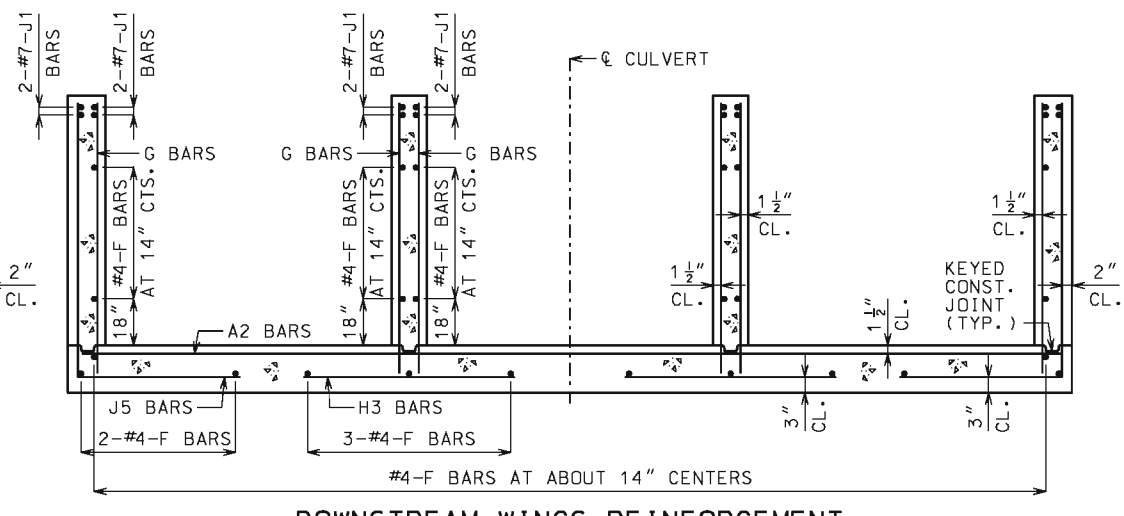
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

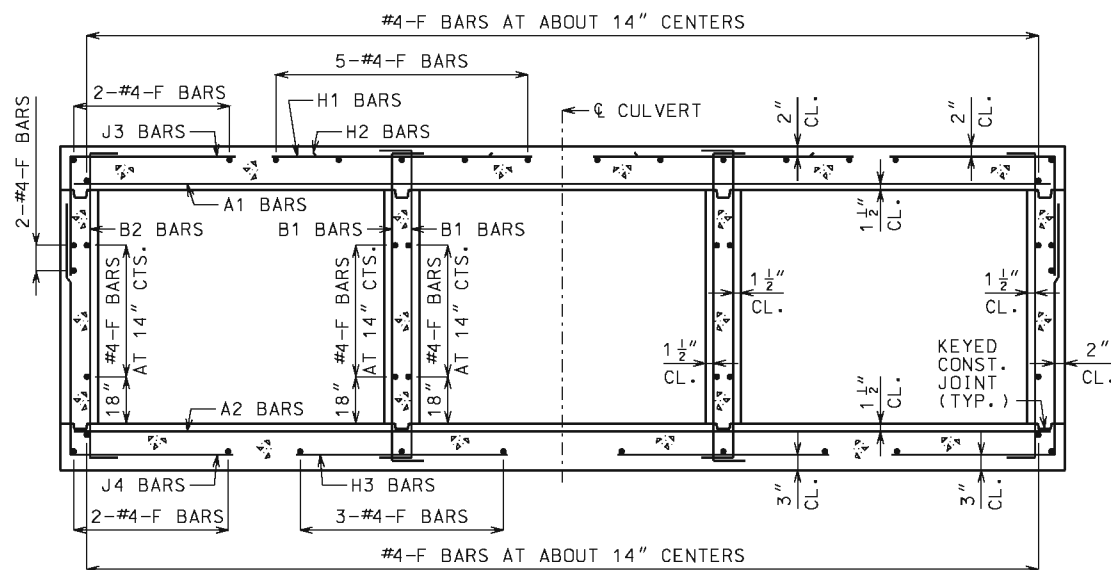
IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



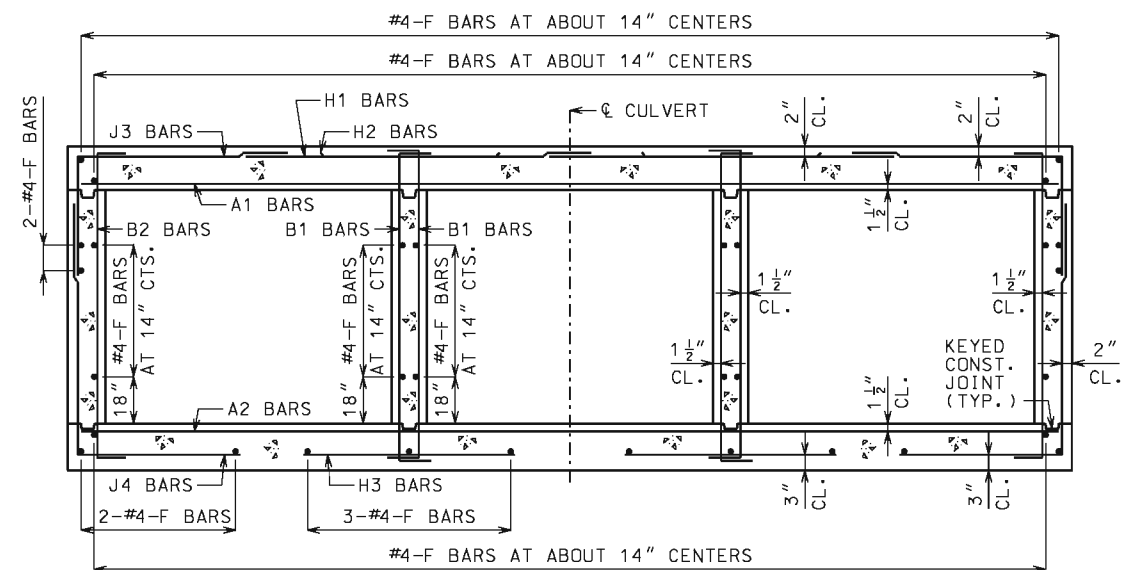
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS


GENERAL NOTES:

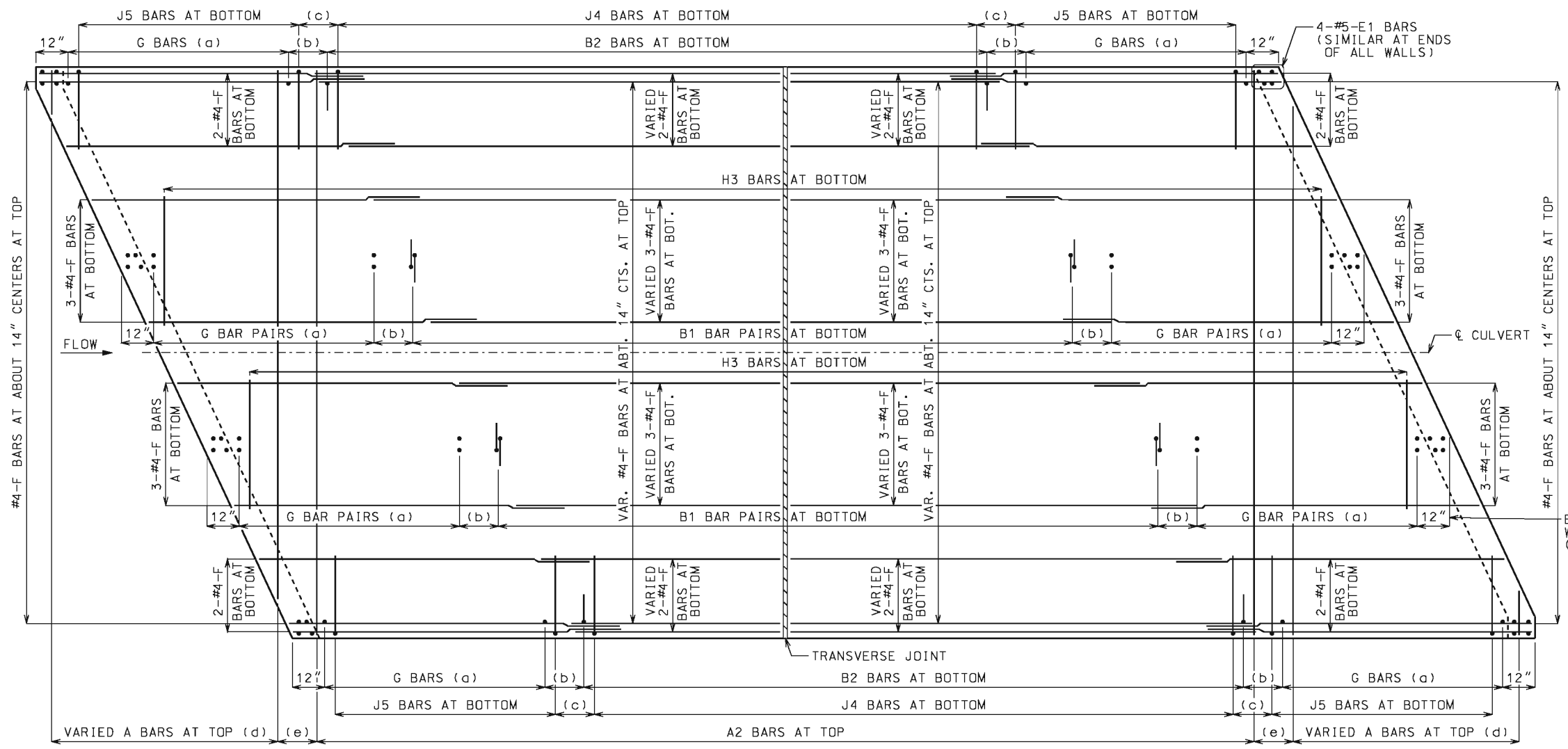
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

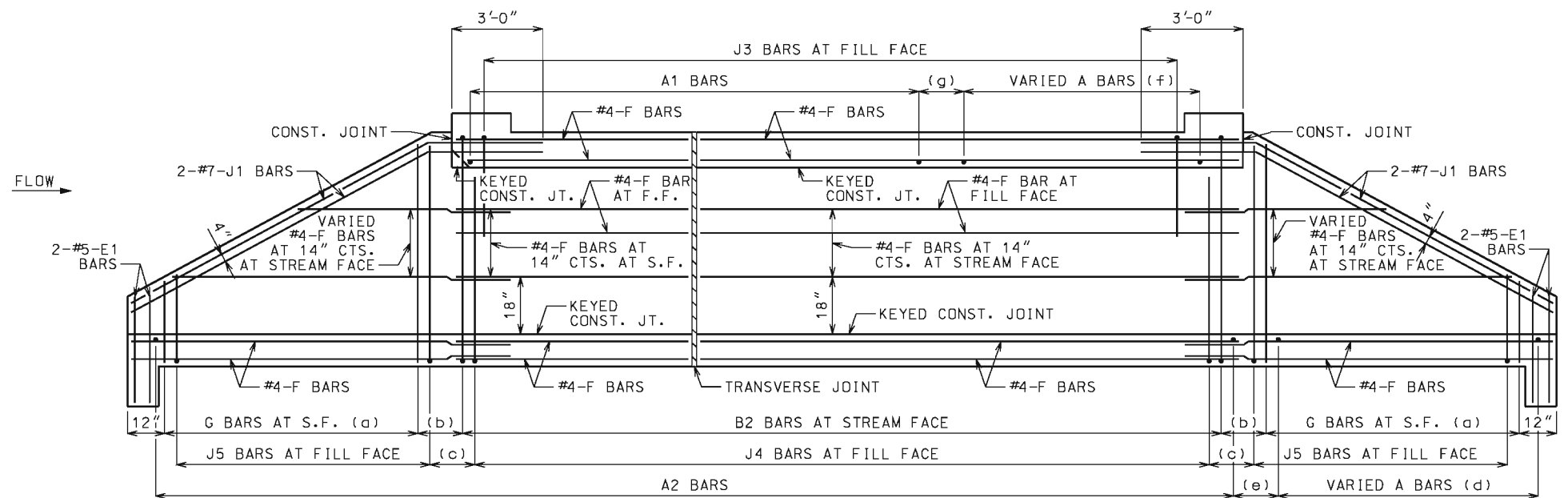
DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}"$.

| | |
|---|----------------|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>CONCRETE TRIPLE BOX CULVERT</p> <p>SKIEW: SQUARED WINGS: FLARED</p> <p>SECTIONS</p> | |
| <p>DATE EFFECTIVE: 12/01/2011</p> <p>DATE PREPARED: 5/13/2015</p> | <p>703.81H</p> |
| <p>SHEET NO. 3 OF 3</p> | |



PLAN OF BOTTOM SLAB



ELEVATION OF EXTERIOR WALL
J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

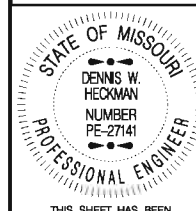
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE
TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: STRAIGHT

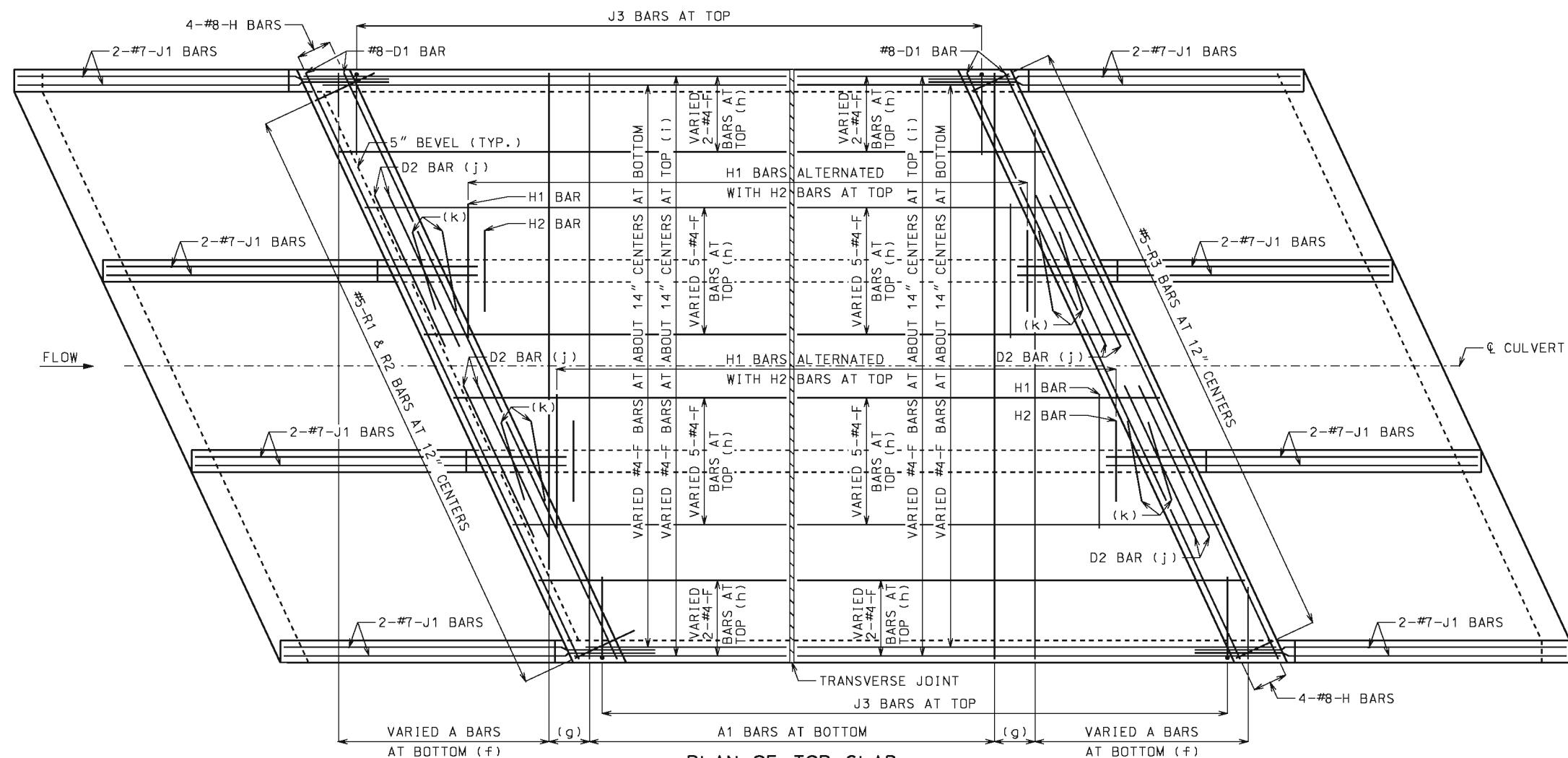
REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

703.82H

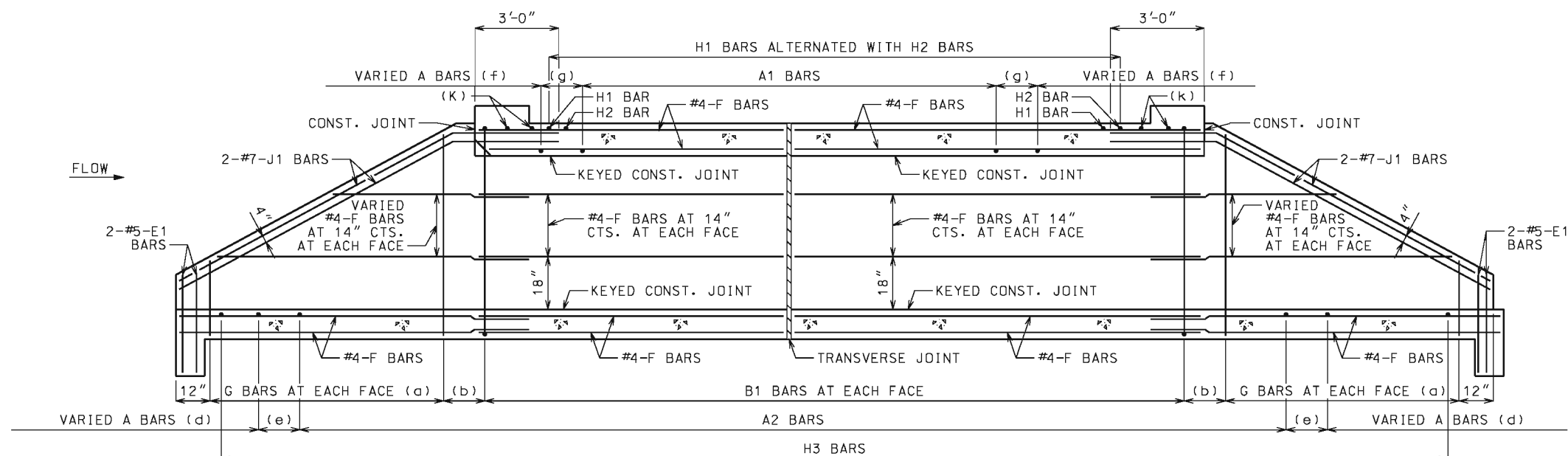
SHEET NO.
1 OF 3

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS



(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

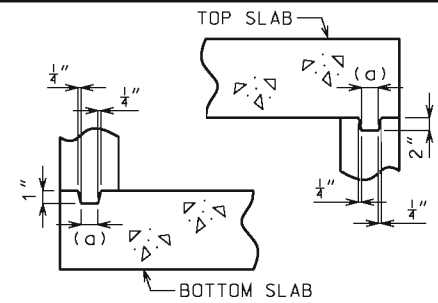
#8 FOR CLEAR SPAN $> 10'-0"$

#9 FOR CLEAR SPAN $> 13'-0"$

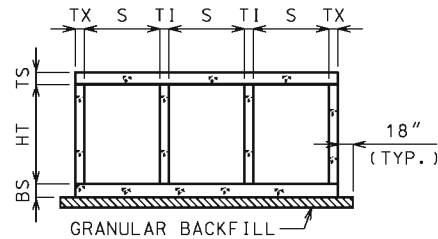
IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

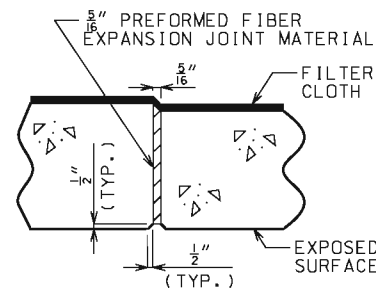
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE TRIPLE BOX CULVERT SKEW: LEFT ADVANCE WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015 | 703.82H |
| SHEET NO. 2 OF 3 | |



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



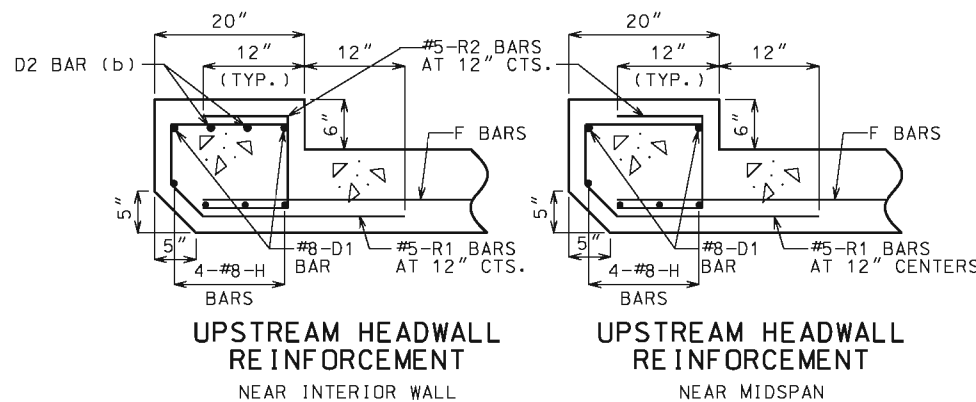
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



UPSTREAM HEADWALL REINFORCEMENT

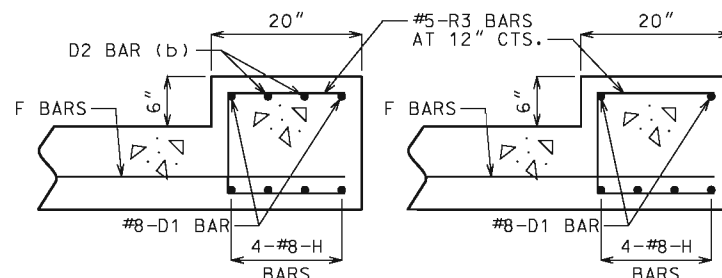
NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

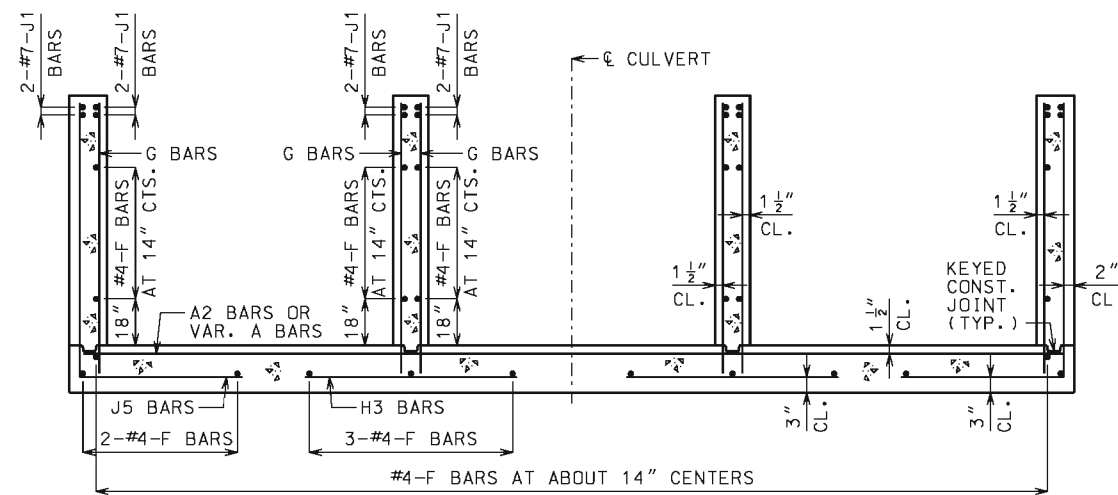


DOWNSTREAM HEADWALL REINFORCEMENT

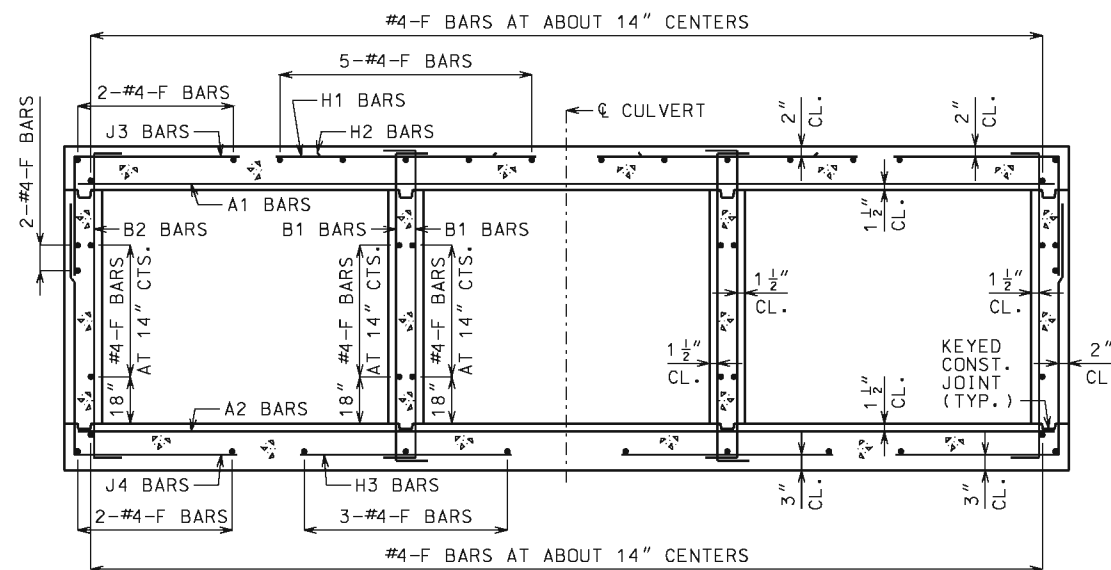
NEAR INTERIOR WALL

DOWNSTREAM HEADWALL REINFORCEMENT

NEAR MIDSPAN

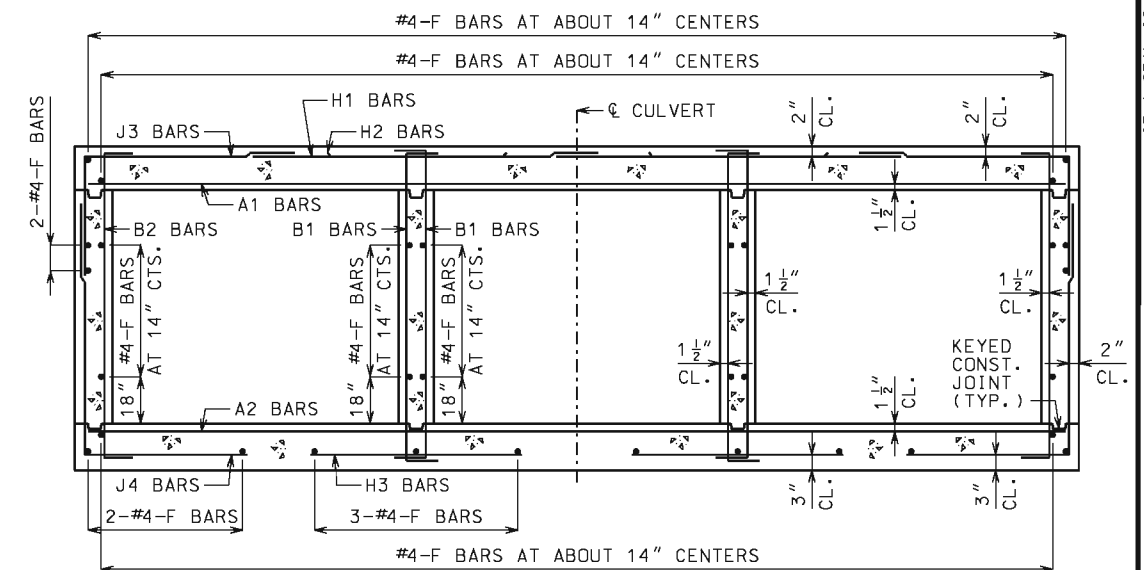


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT

FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

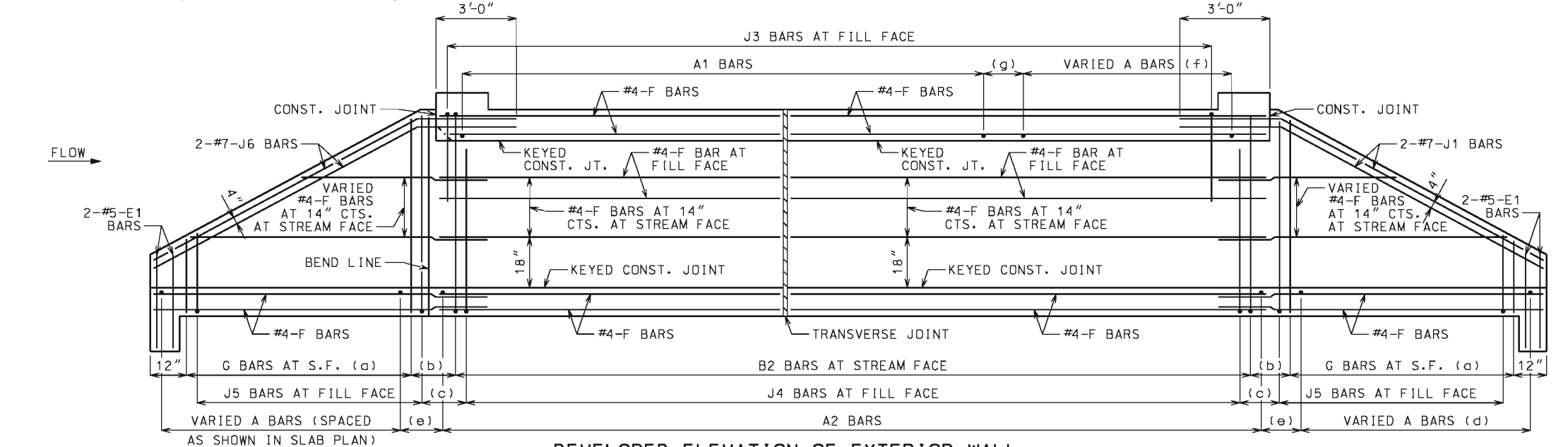
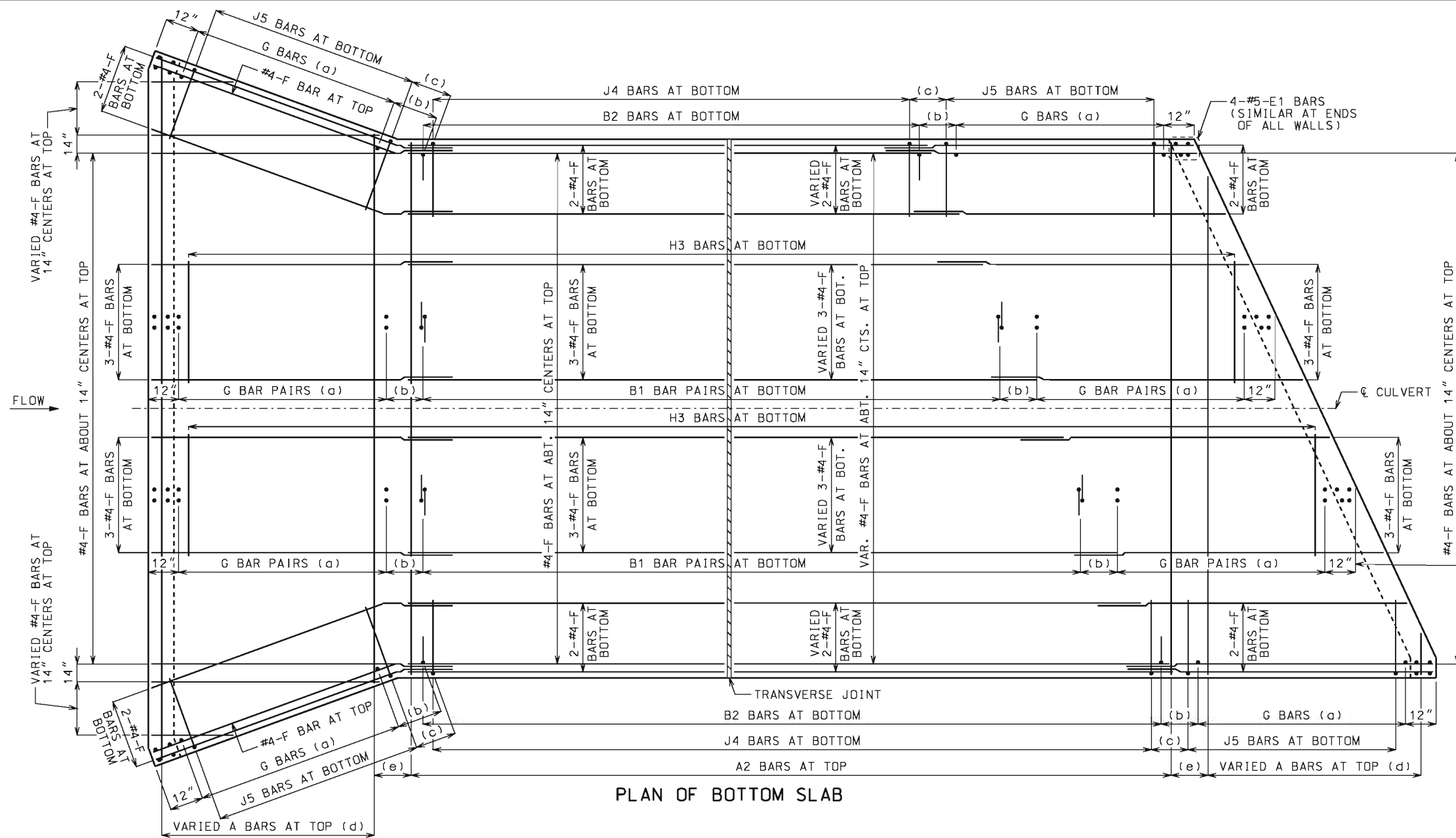
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2 inch.

| | | | |
|---|--|---|--|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | <p>CONCRETE TRIPLE BOX CULVERT</p> <p>SKEW: LEFT ADVANCE WINGS: STRAIGHT</p> <p>SECTIONS</p> | |
| <p>STATE OF MISSOURI DENNIS W. HECKMAN NUMBER PE-27141 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | | <p>DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015</p> | |
| <p>703.82H</p> | | <p>SHEET NO. 3 OF 3</p> | |



J1 AND J6 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

END OF WALL (TYP.) (NOT SHOWN)

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1 1/2".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

CONCRETE TRIPLE BOX CULVERT

SKEW: LEFT ADVANCE
WINGS: FLARED

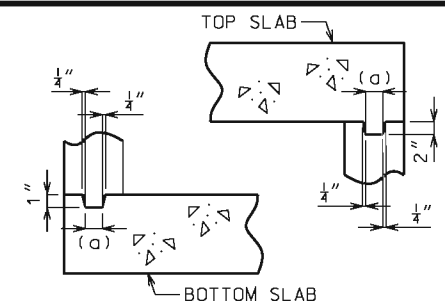
REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

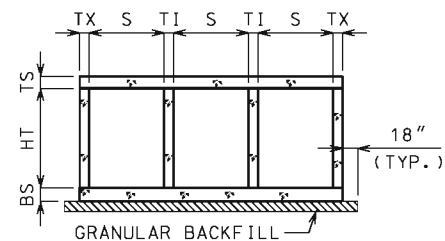
703.83H

SHEET NO.
1 OF 3

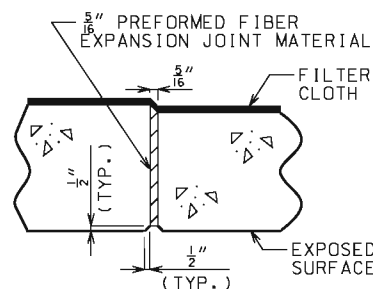
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



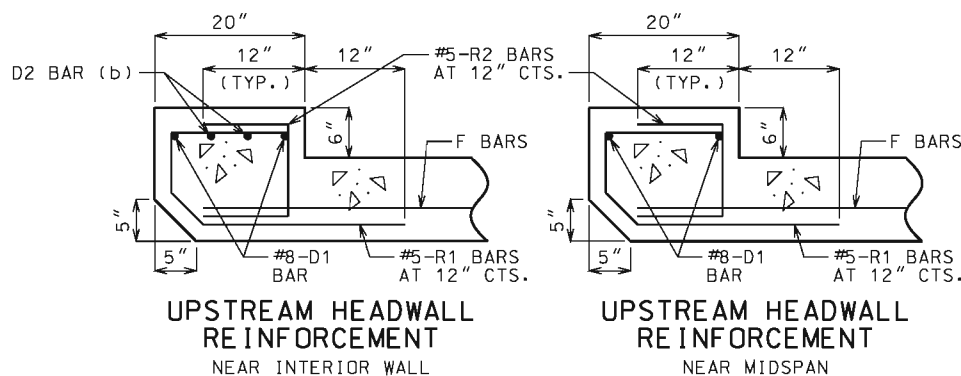
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

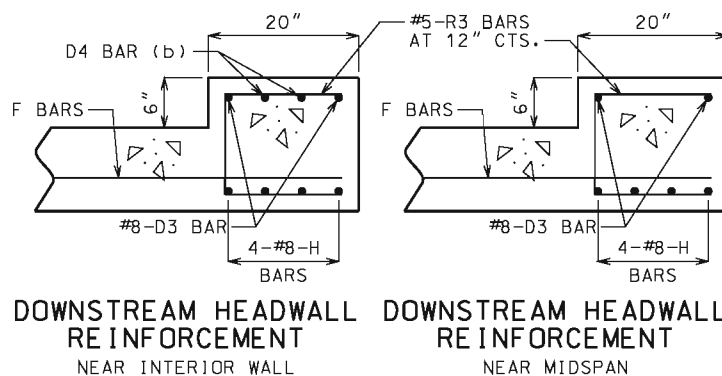


UPSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL

UPSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN

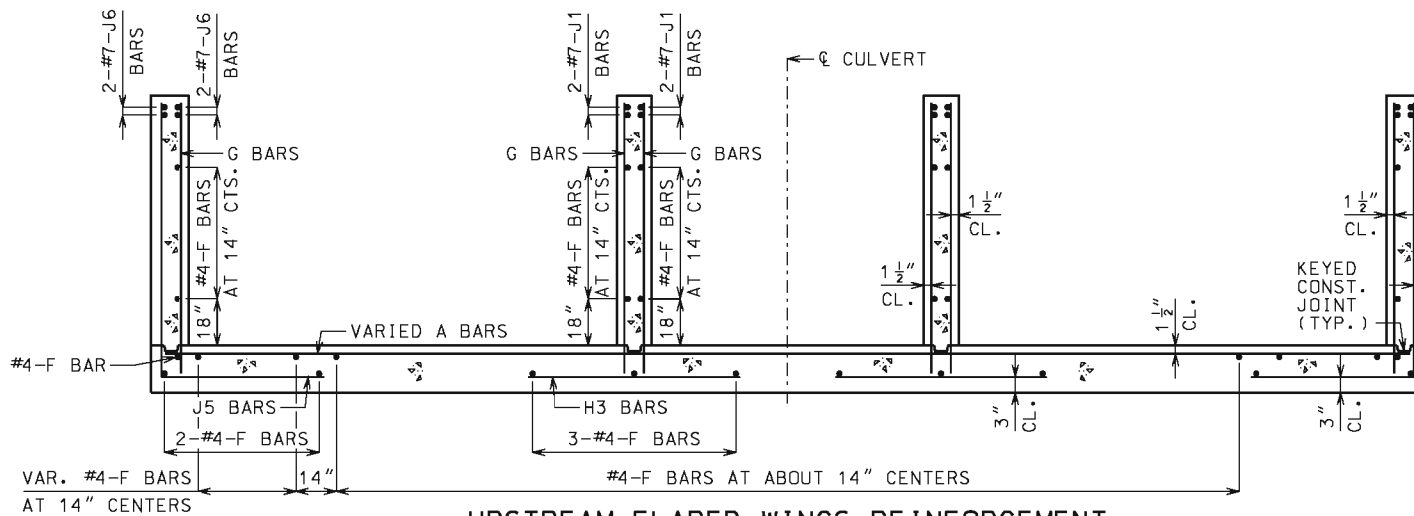
(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

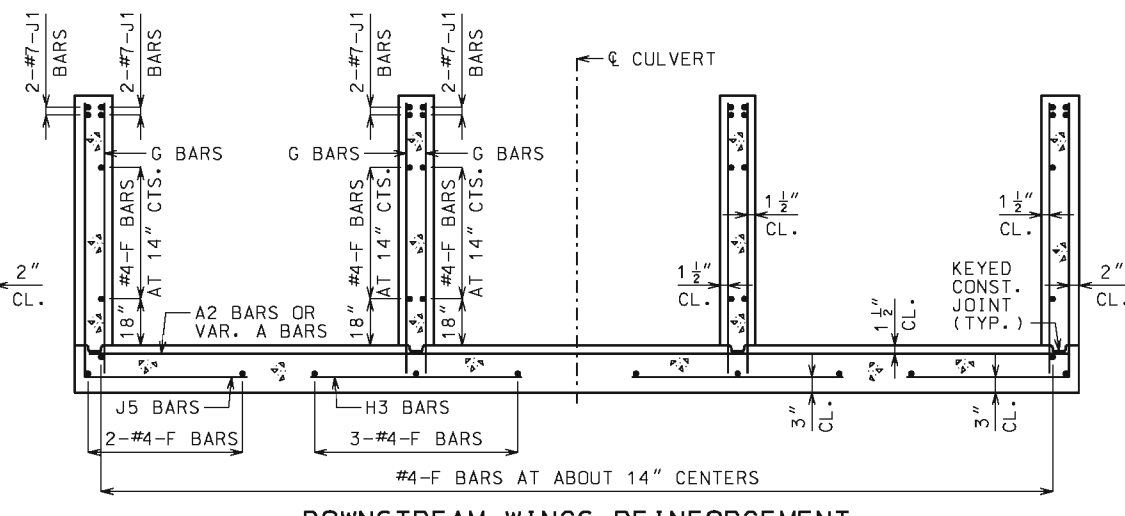


DOWNSTREAM HEADWALL REINFORCEMENT
NEAR INTERIOR WALL

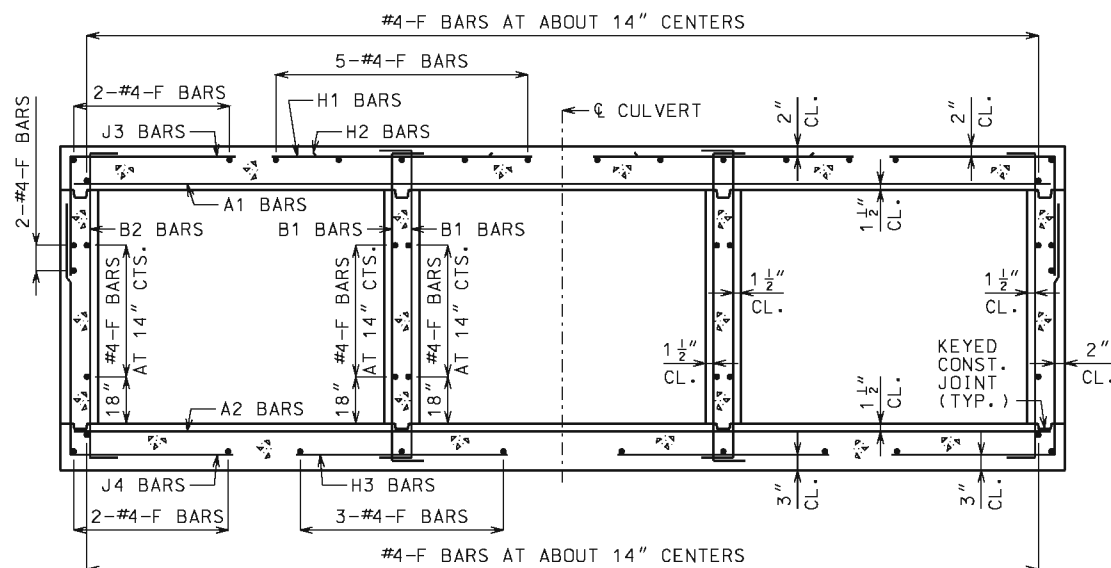
DOWNSTREAM HEADWALL REINFORCEMENT
NEAR MIDSPAN



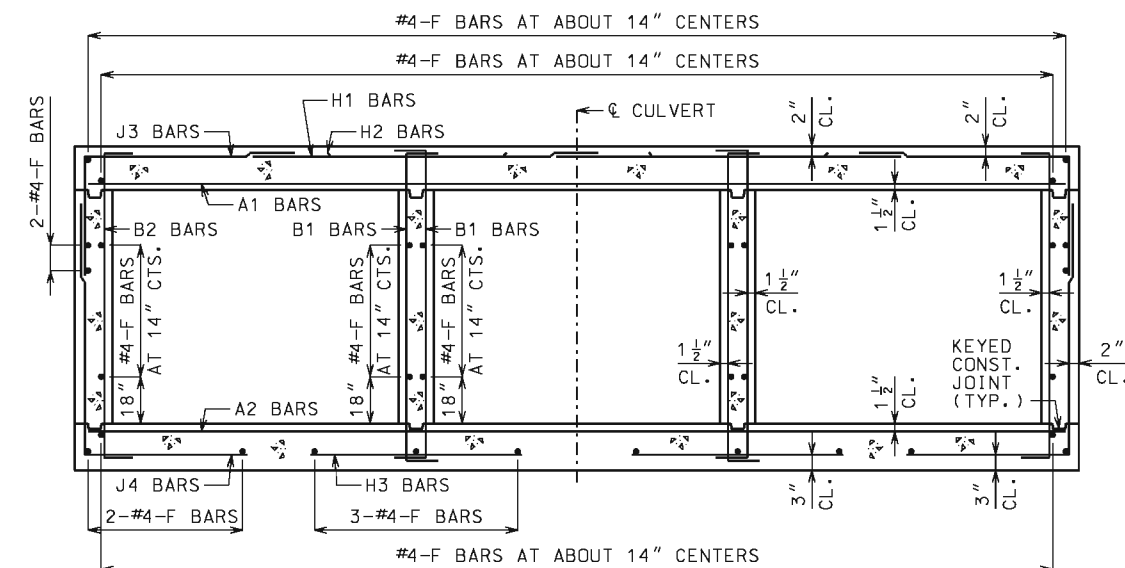
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

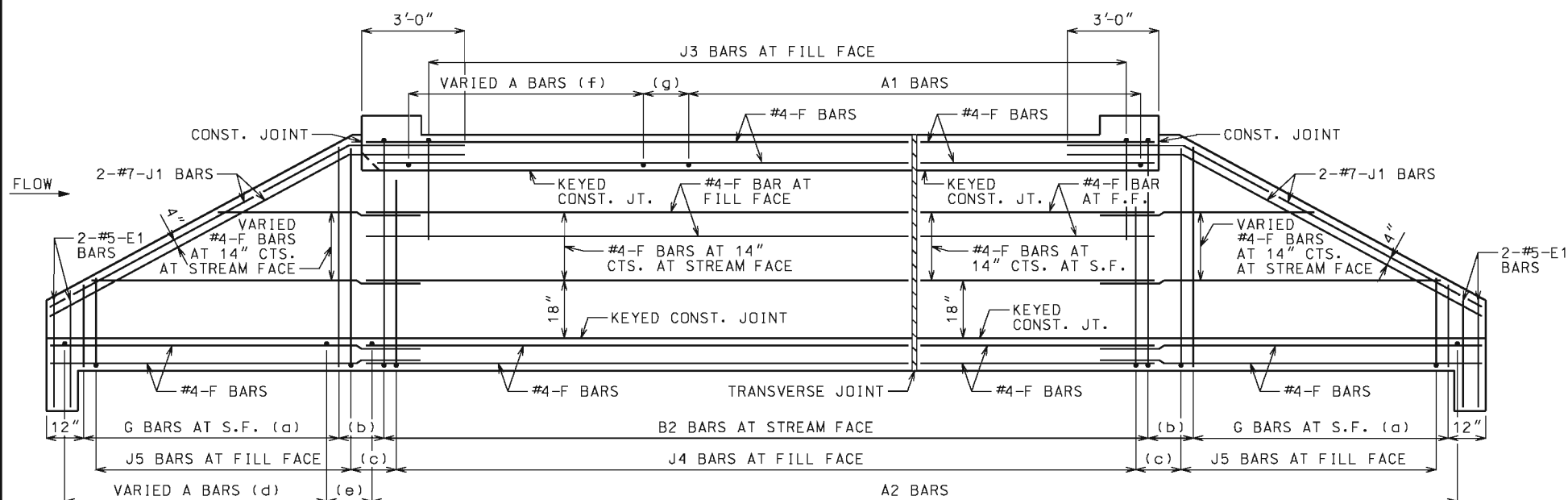
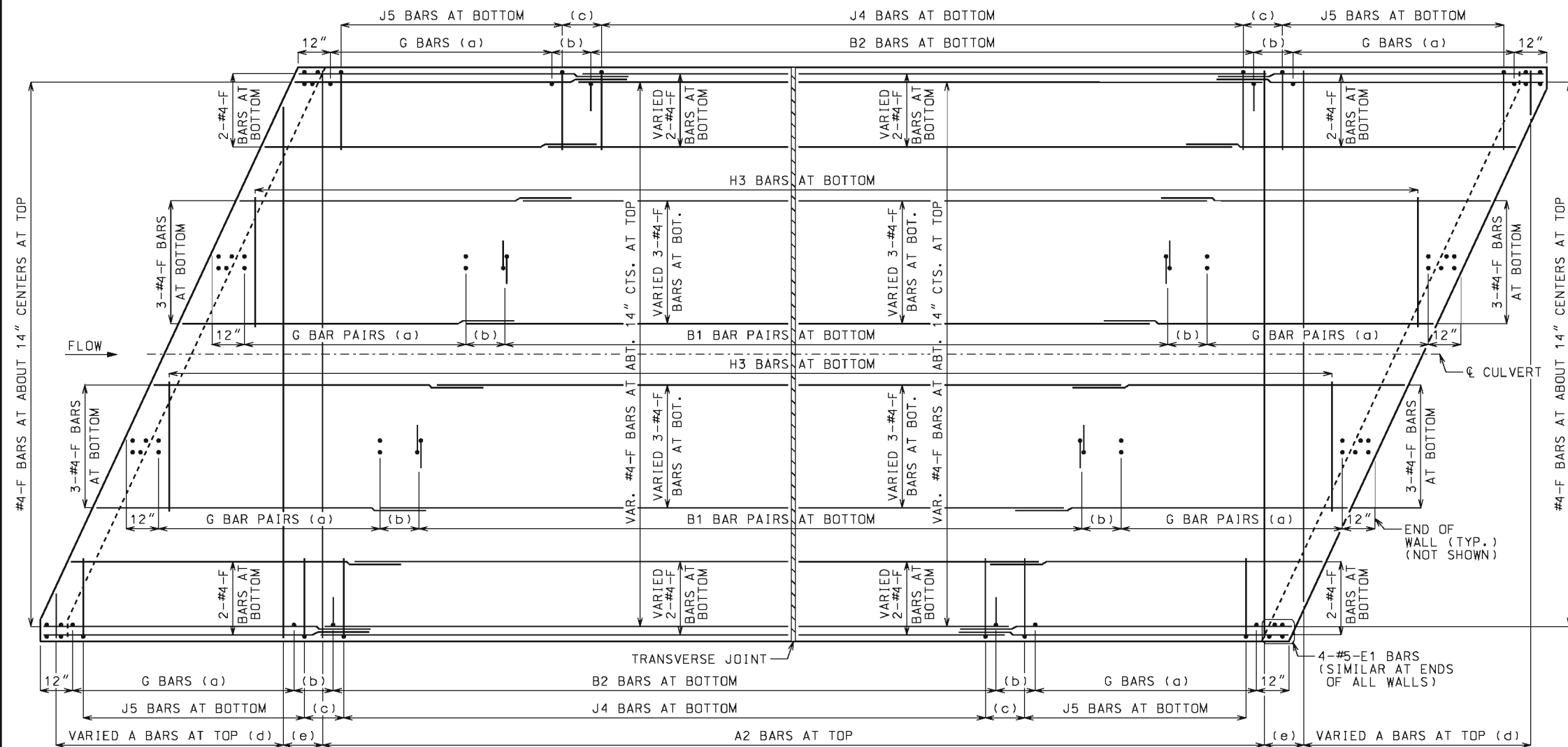
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}"$.

| | |
|---|-----------------------|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>CONCRETE TRIPLE BOX CULVERT</p> <p>SKEW: LEFT ADVANCE WINGS: FLARED</p> <p>SECTIONS</p> | |
| <p>DATE EFFECTIVE: 12/01/2011</p> <p>DATE PREPARED: 5/13/2015</p> | <p>703.83H</p> |
| <p>SHEET NO. 3 OF 3</p> | |



J1 BARS MAY BE BENT IN FIELD OR SHOP.

LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET. USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

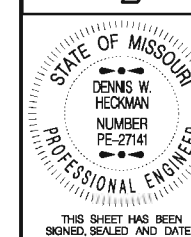
(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE
TRIPLE BOX CULVERT

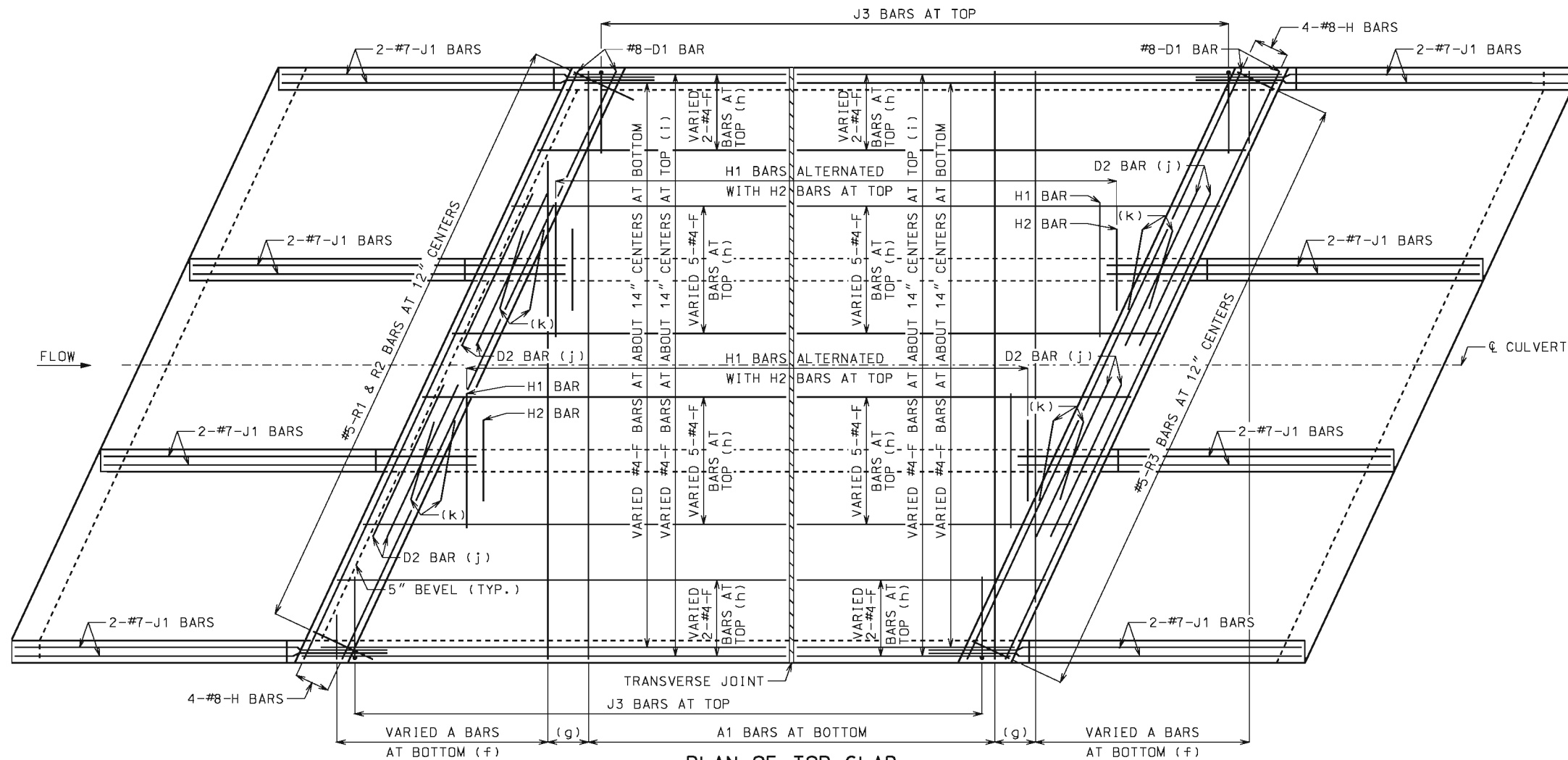
SKEW: RIGHT ADVANCE
WINGS: STRAIGHT

REINFORCEMENT

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

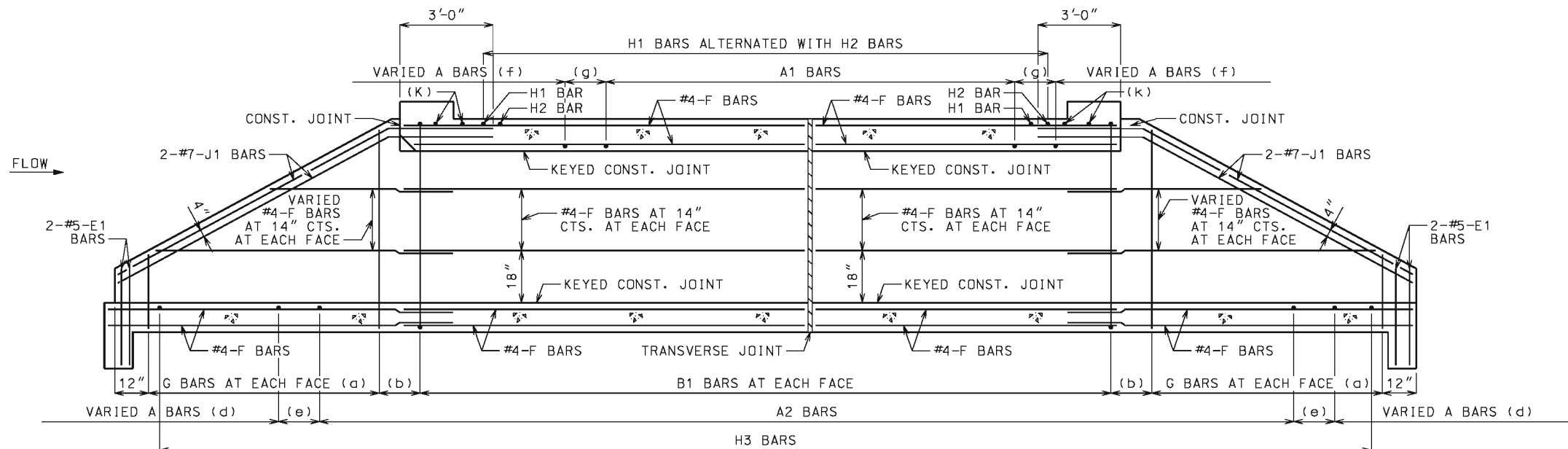
703.84H

SHEET NO.
1 OF 3



PLAN OF TOP SLAB

B BARS IN WALLS ARE NOT SHOWN FOR CLARITY.
FOR PLACEMENT, SEE SHEET 1 OF 3.



SECTION NEAR INTERIOR WALL

J1 BARS MAY BE BENT IN FIELD OR SHOP.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND SECTION, SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) NOT SPECIFIED ON THIS SHEET

(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING

(f) SAME SIZE AND SPACING AS A1 BARS

(g) A1 BAR SPACING

(h) FOR DESIGN FILLS OVER 2'-0"

(i) FOR DESIGN FILLS 2'-0" OR LESS


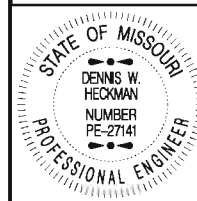
(j) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$

#8 FOR CLEAR SPAN $> 10'-0"$

#9 FOR CLEAR SPAN $> 13'-0"$

IF REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

(k) H2 BARS AS REQUIRED, QUANTITY OF BARS VARIES WITH SKEW.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CONCRETE TRIPLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: STRAIGHT REINFORCEMENT |
| DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015 | 703.84H |
| SHEET NO. 2 OF 3 | |

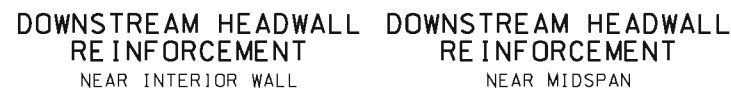


PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

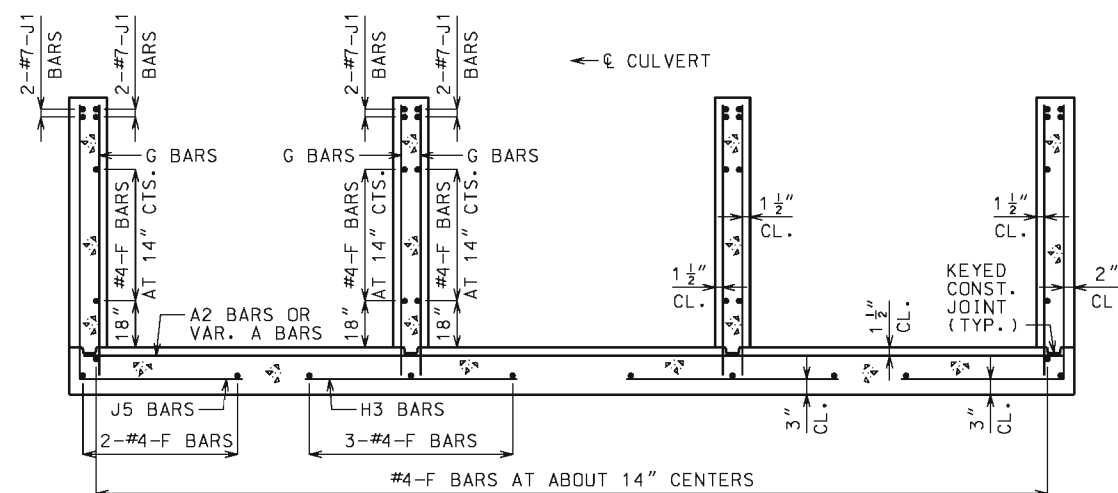
FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.



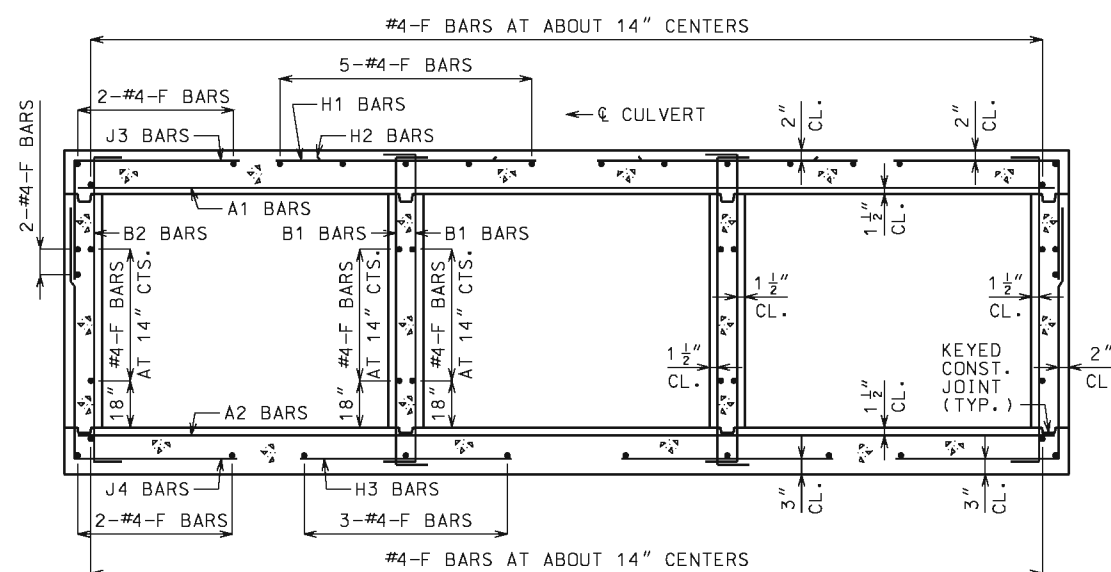
(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
 #8 FOR CLEAR SPAN $> 10'-0"$
 #9 FOR CLEAR SPAN $> 13'-0"$



IF D2 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF C WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.

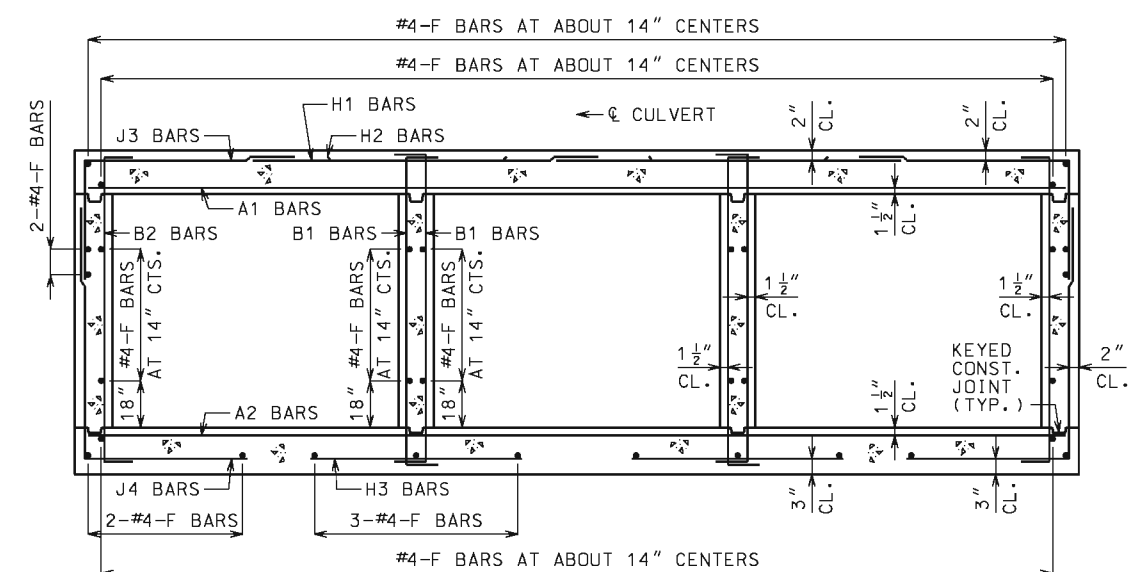


UPSTREAM AND DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT

FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

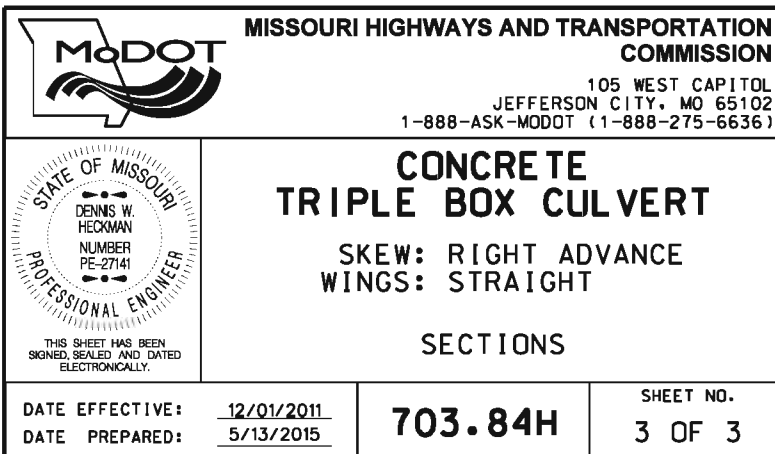
GENERAL NOTES:

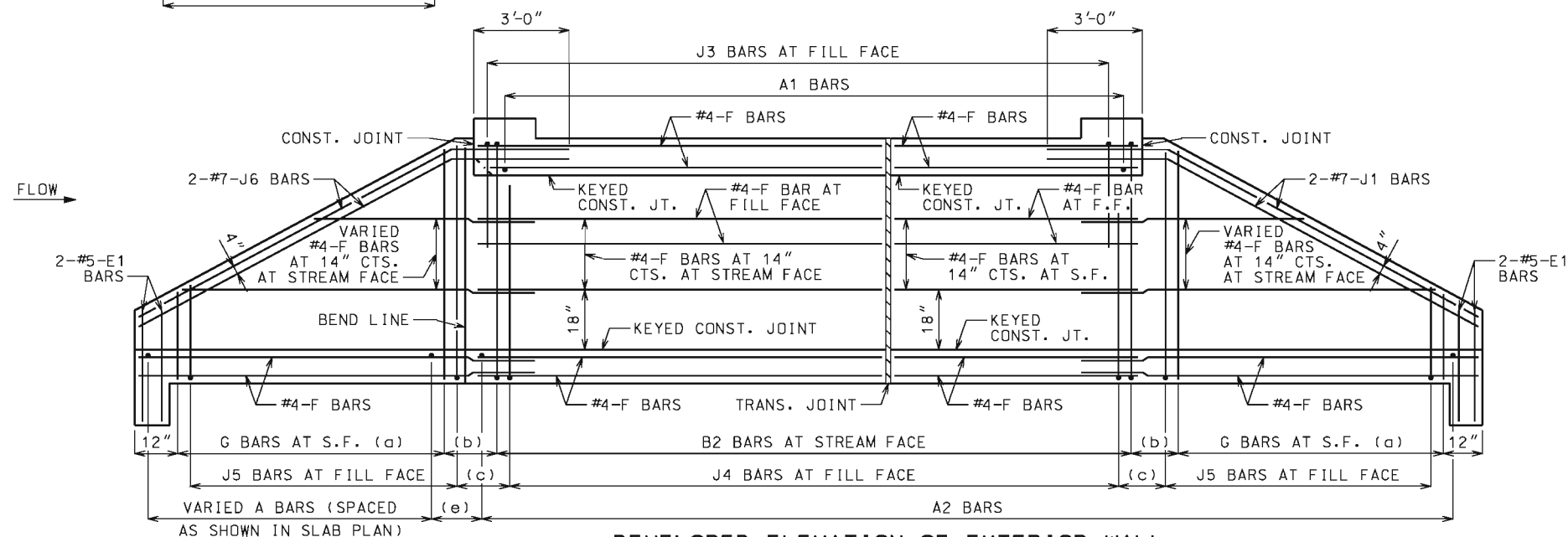
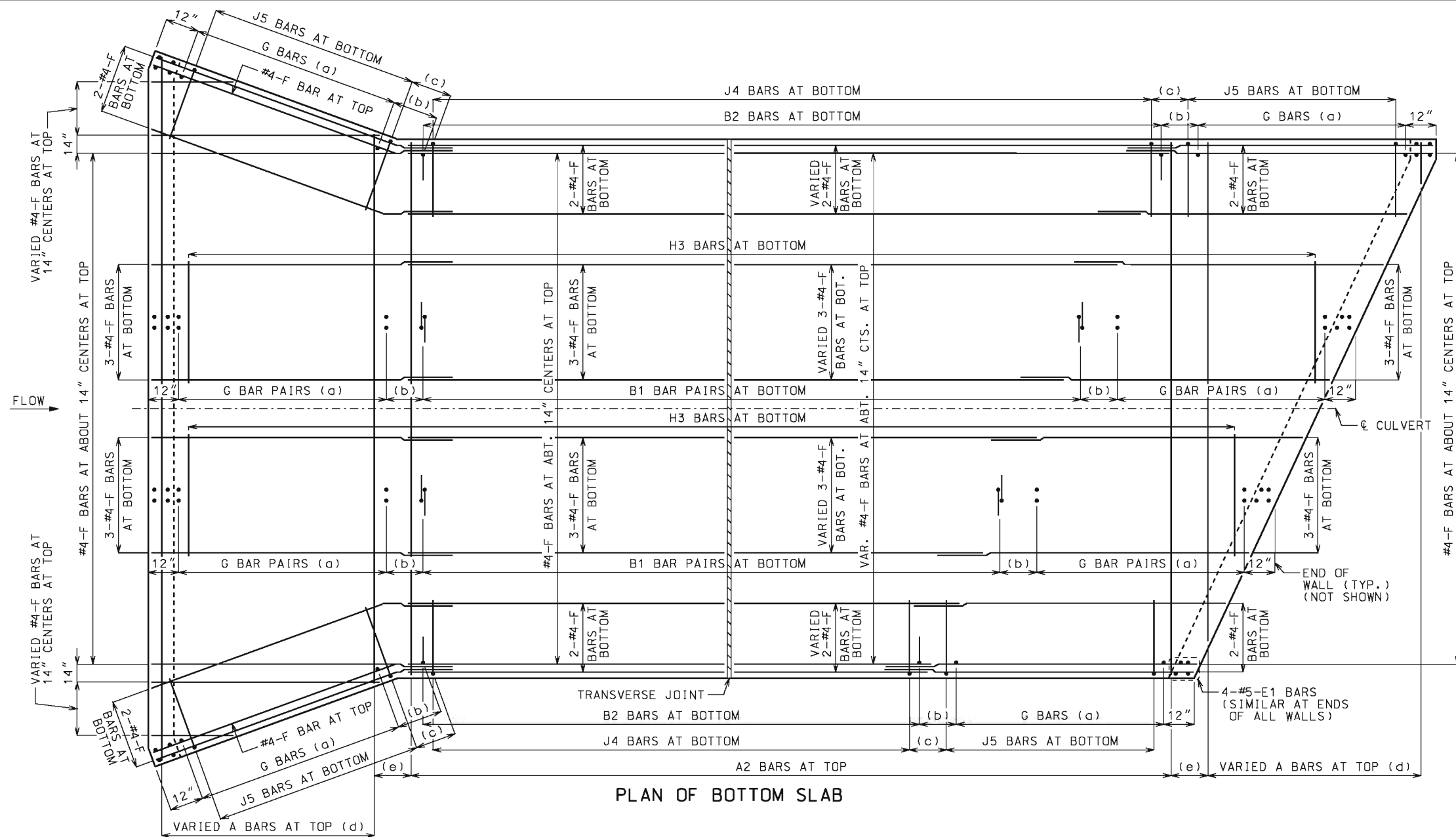
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW
DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING
STEEL SHALL BE $1\frac{1}{2}$ ".





LAYING OUT TRANVERSE JOINTS

UNLESS SHOWN ON BRIDGE PLANS

USE A TRANSVERSE JOINT WHEN BARREL LENGTH IS OVER 80 FEET.
USE ADDITIONAL JOINTS TO LIMIT CUT SECTION LENGTH AND END SECTION BARREL LENGTH MEASURED ALONG CENTERLINE OF CULVERT TO 50 FEET.

MINIMUM END SECTION LENGTH SHALL BE 3 FEET MEASURED ALONG THE SHORTEST WALL FROM THE INSIDE FACE OF HEADWALL TO THE TRANSVERSE JOINT.

TO AVOID LOCATING TRANSVERSE JOINTS UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS THE FOLLOWING SHALL APPLY:

BARREL LENGTH UP TO 90 FEET WITHOUT A TRANSVERSE JOINT

CUT SECTION LENGTHS UP TO 60 FEET

WHEN BARREL AND CUT SECTION LENGTH RESTRICTIONS REQUIRE TRANSVERSE JOINTS TO BE LOCATED UNDER A TRAVELED WAY WITH DESIGN FILLS 2 FEET OR LESS, THE JOINTS SHALL BE LOCATED TO MINIMIZE THE LENGTH OF JOINT UNDER THE TRAVELED WAY.

TRAVELED WAY IS THE ROADWAY WIDTH MINUS SHOULDER WIDTHS.

FOR CUT SECTION DETAILS, SEE 703.86.

GENERAL NOTES:

FOR SECTIONS THRU BARREL, WINGS AND HEADWALLS, SEE SHEET 3 OF 3. FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PLAN AND ELEVATION. SEE SHEET 3 OF 3 FOR DETAILS.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".

LAP LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES.

BEVELED HEADWALL SHALL BE LOCATED AT UPSTREAM END.

(a) SAME SIZE AND SPACING AS ADJACENT B BARS

(b) VARIES, 12" MAXIMUM

(c) J4 BAR SPACING

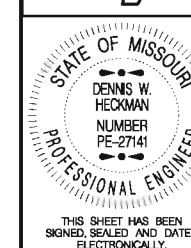
(d) SAME SIZE AND SPACING AS A2 BARS

(e) A2 BAR SPACING



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE
TRIPLE BOX CULVERT

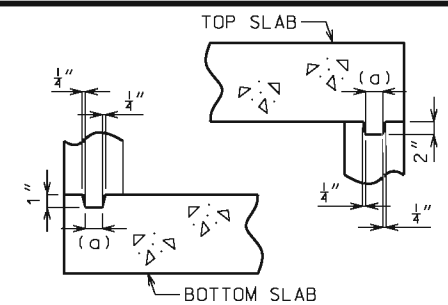
SKEW: RIGHT ADVANCE
WINGS: FLARED

REINFORCEMENT

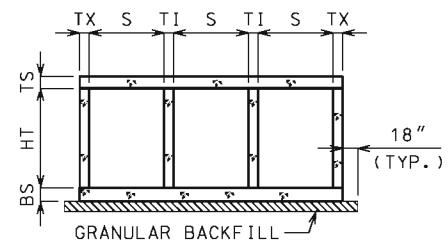
DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 5/13/2015

703.85C

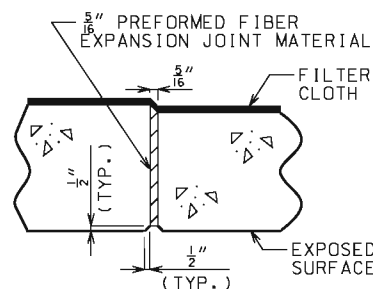
SHEET NO.
1 OF 3



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



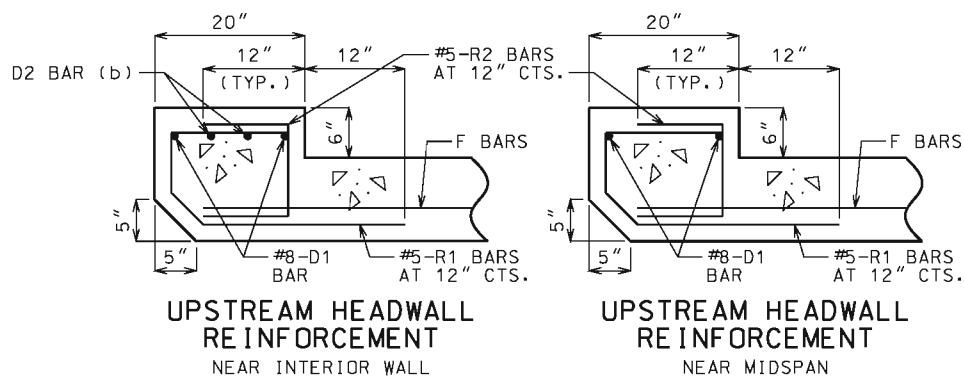
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

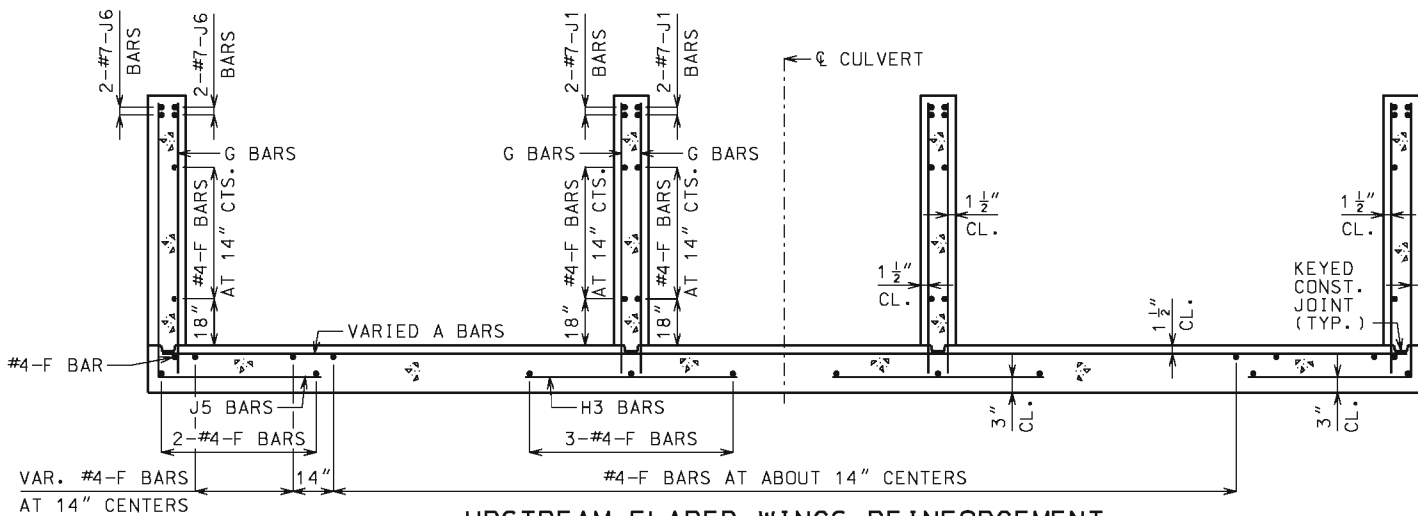
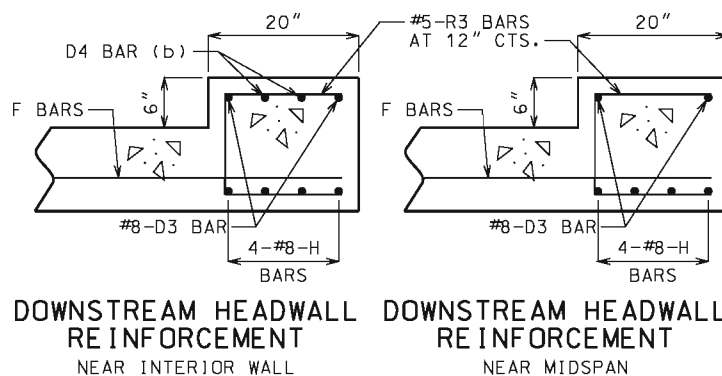
PREFORMED FIBER EXPANSION JOINT MATERIAL IN ACCORDANCE WITH SEC 1057 SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 10 GAGE COPPER WIRE OR 12 GAGE SOFT DRAWN GALVANIZED STEEL WIRE.

FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

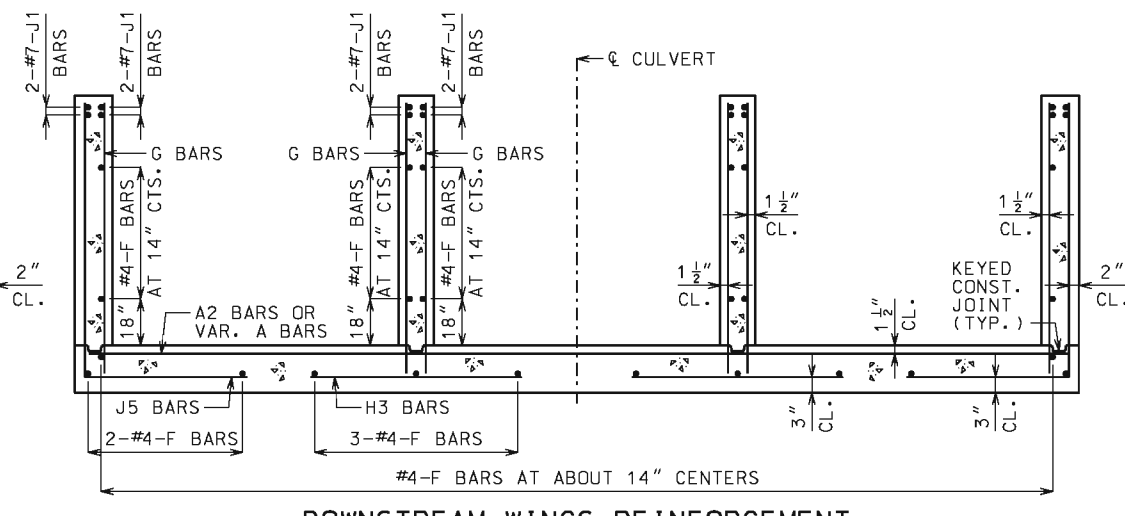


(b) NOT REQUIRED FOR CLEAR SPANS $\leq 10'-0"$
#8 FOR CLEAR SPAN $> 10'-0"$
#9 FOR CLEAR SPAN $> 13'-0"$

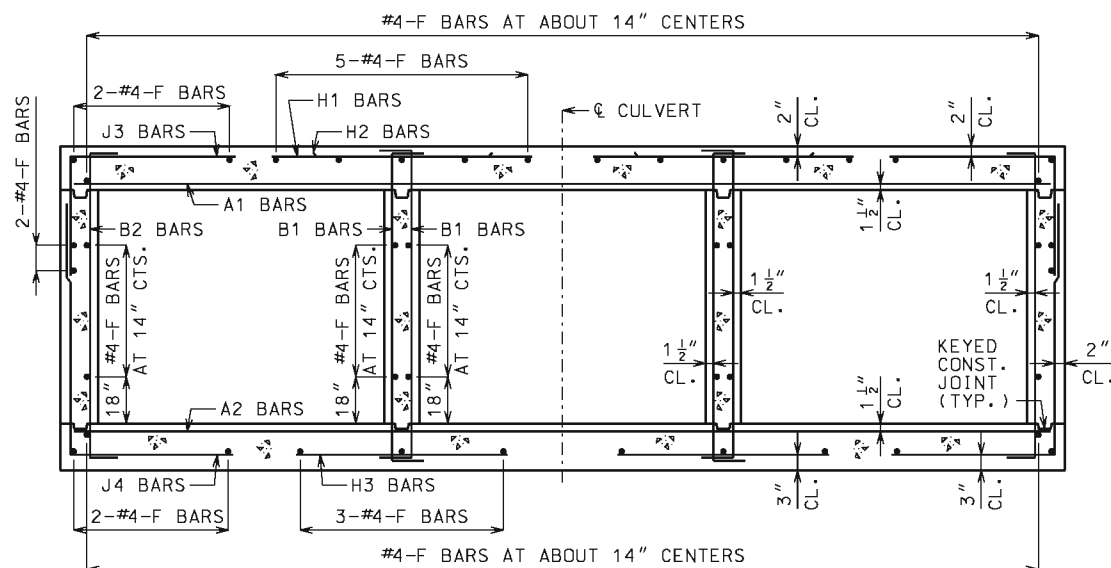
IF D2 AND D4 BARS ARE REQUIRED, THE MINIMUM LENGTH EACH SIDE OF ϕ WALL SHALL BE THE GREATER OF 48 BAR DIAMETERS OR $\frac{1}{4}$ CLEAR SPAN. THE CLEAR SPAN IS PARALLEL TO LONG DIRECTION OF HEADWALL.



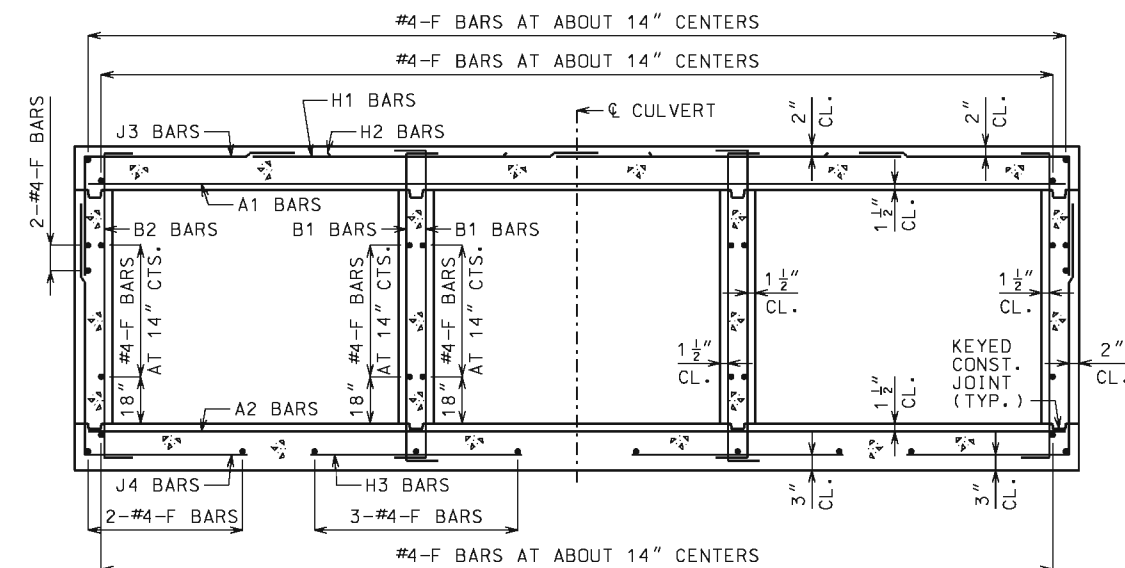
UPSTREAM FLARED WINGS REINFORCEMENT



DOWNSTREAM WINGS REINFORCEMENT



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS

GENERAL NOTES:

FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS OF ALL REINFORCEMENT EXCEPT J5 BARS, SEE 703.87. FOR J5 BARS, SEE 703.37.

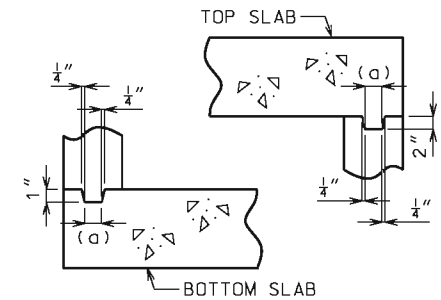
BARREL AND WINGS SECTIONS ARE SYMMETRICAL ABOUT AND NORMAL TO ϕ CULVERT. HEADWALL SECTIONS ARE NORMAL TO LONG DIRECTION OF HEADWALL.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.

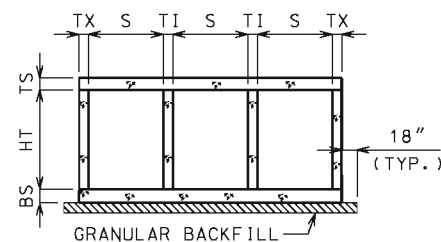
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}"$.

| | | |
|--|-----------------------|------------------------------------|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | |
| <p>CONCRETE TRIPLE BOX CULVERT SKEW: RIGHT ADVANCE WINGS: FLARED</p> | | |
| <p>SECTIONS</p> | | |
| <p>DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015</p> | <p>703.85C</p> | <p>SHEET NO. 3 OF 3</p> |

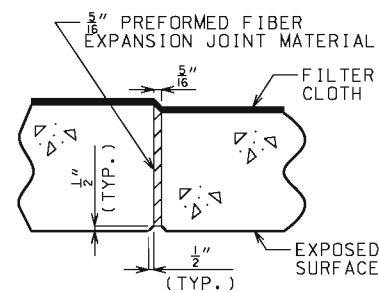
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



KEYED CONSTRUCTION JOINT
(a) APPROXIMATELY ONE-THIRD OF WALL THICKNESS



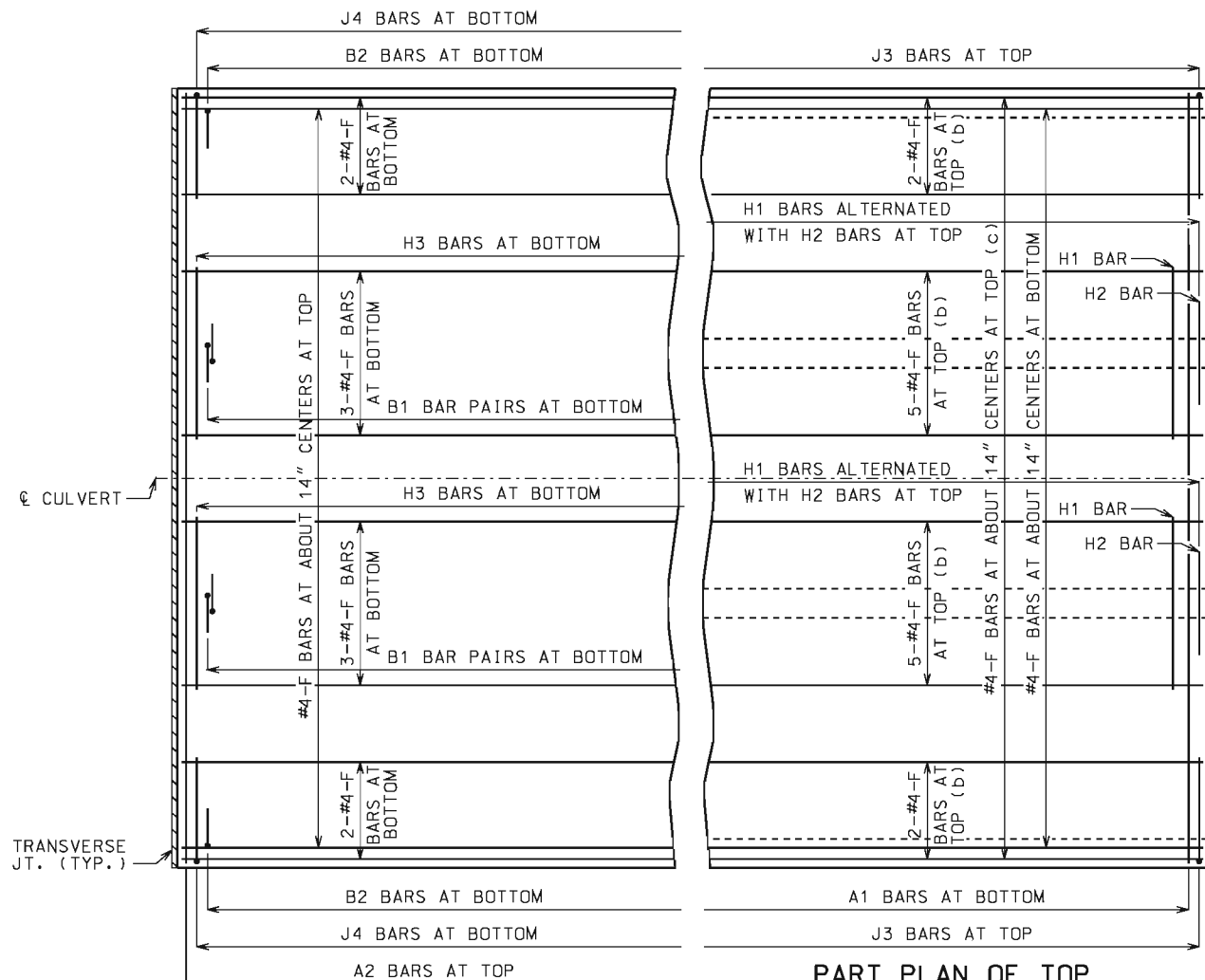
GRANULAR BACKFILL LIMITS AND MEMBER DIMENSIONS



TRANSVERSE JOINT THRU BARREL

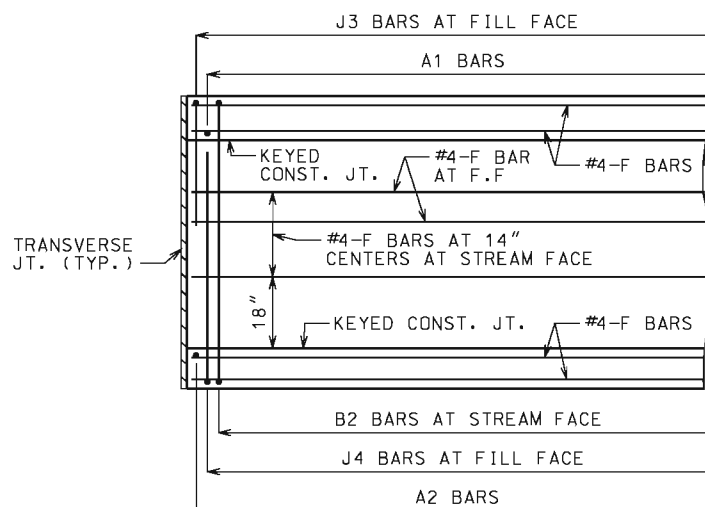
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FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE CENTERED ON TRANSVERSE JOINTS IN TOP SLAB AND SIDEWALLS WITH EDGES SEALED WITH MASTIC OR TWO SIDED TAPE. FILTER CLOTH SHALL BE A SUBSURFACE DRAINAGE GEOTEXTILE IN ACCORDANCE WITH SEC 1011. COST OF FURNISHING AND INSTALLING FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

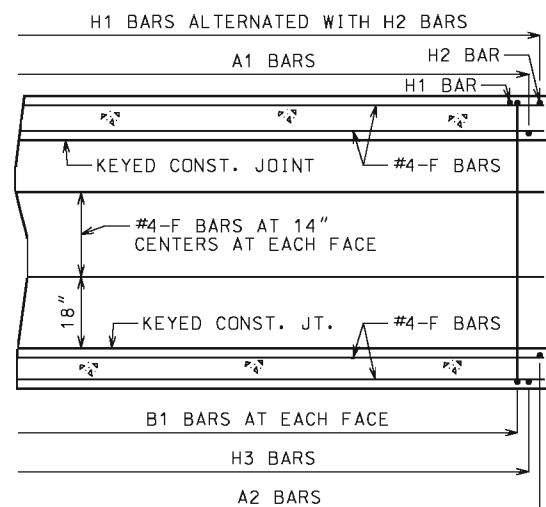


PART PLAN OF BOTTOM SLAB REINFORCEMENT

PART PLAN OF TOP SLAB REINFORCEMENT
(b) FOR DESIGN FILLS OVER 2'-0"
(c) FOR DESIGN FILLS 2'-0" OR LESS



PART ELEVATION OF EXTERIOR WALL REINFORCEMENT



PART SECTION NEAR INTERIOR WALL REINFORCEMENT

GENERAL NOTES

DESIGN SPECIFICATIONS:
2010 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND 2010 INTERIM REVISIONS

DESIGN LOADING:
VEHICULAR = HL-93 MINUS LANE LOAD, EARTH = 120 LB/CF
EQUIVALENT FLUID PRESSURE = 30 LB/CF (MIN.), 60 LB/CF (MAX.)

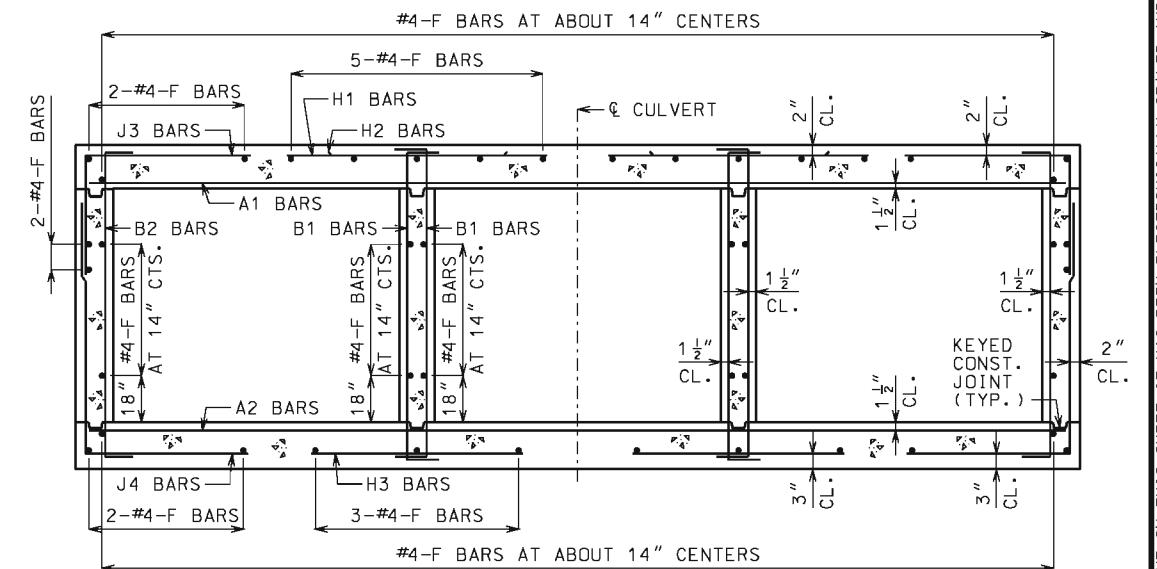
DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE (BOX CULVERT) $f'_c = 4,000$ PSI
REINFORCING STEEL (GRADE 60) $f_y = 60,000$ PSI

MISCELLANEOUS:
FOR MEMBER THICKNESS AND FOR BAR SIZES, SPACING AND DIMENSIONS, SEE 703.87.

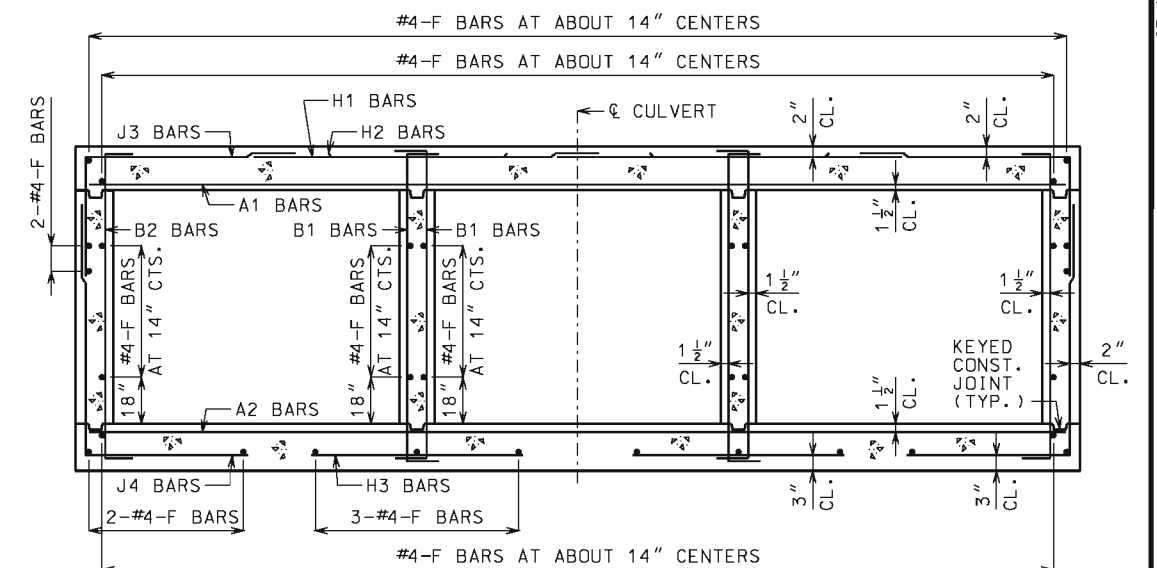
CONSTRUCTION JOINT KEY NOT SHOWN FOR CLARITY IN PART PLANS, PART ELEVATION AND PART SECTION.

DRAWING NOT TO SCALE. FOLLOW DIMENSIONS.


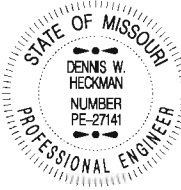
MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE $1\frac{1}{2}$ ".



BARREL REINFORCEMENT
FOR DESIGN FILLS OVER 2'-0"
SYMMETRICAL ABOUT AND NORMAL TO ϵ CULVERT.



BARREL REINFORCEMENT
FOR DESIGN FILLS 2'-0" OR LESS
SYMMETRICAL ABOUT AND NORMAL TO ϵ CULVERT.

| | | |
|--|--|---------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | CONCRETE TRIPLE BOX CULVERT CUT SECTION | |
| | DATE EFFECTIVE: 12/01/2011 DATE PREPARED: 5/13/2015 | 703.86 |

| SPAN (S) = 3 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 2 FT OR 3 FT OR 4 FT | | | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|------|------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|-------|---------|------|------|------------------------------------|-----------|------|---------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | Ø8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=2' | HT=3' | HT=4' | | | | | | | | | | | | | | HT=2' | HT=3' | HT=4' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 26.8 | 26.0 | 26.0 | 26.0 | 4 | 24 | 39.5 | 30.5 | 4 | 24 | 20.0 | 20.0 | 4 | 12 | 4 | 12 | 36.0 | 28 | 40 | 52 | 4 | 12 | 25.0 | 25.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 26.8 | 26.0 | 26.0 | 26.0 | 4 | 24 | 39.5 | 30.5 | 4 | 24 | 20.0 | 20.0 | 4 | 12 | 4 | 12 | 35.0 | 28 | 40 | 52 | 4 | 12 | 24.0 | 24.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.8 | 24.0 | 24.0 | 24.0 | 4 | 24 | 39.5 | 34.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 12 | 31.1 | 28 | 40 | 52 | 4 | 12 | 23.0 | 24.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 31.1 | 24.0 | 24.0 | 24.0 | 4 | 24 | 26.0 | 26.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 28.9 | 28 | 40 | 52 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 28.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 24.0 | 24.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 27.3 | 28 | 40 | 52 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.1 | 24.0 | 24.0 | 24.0 | 4 | 24 | 23.0 | 24.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 26.5 | 28 | 40 | 52 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 25.0 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 23.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 24.5 | 28 | 40 | 52 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.9 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 23.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 24.5 | 28 | 40 | 52 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.8 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 24.4 | 28 | 40 | 52 | 4 | 11.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.8 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 24.4 | 28 | 40 | 52 | 4 | 11 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.6 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 24.3 | 28 | 40 | 52 | 4 | 10.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 22 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.6 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 12 | 24.3 | 28 | 40 | 52 | 4 | 9.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 24 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 11.5 | 4 | 12 | 24.3 | 28 | 40 | 52 | 4 | 9 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 26 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 10.5 | 4 | 11 | 24.1 | 28 | 40 | 52 | 4 | 9 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 28 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 10 | 4 | 10 | 24.1 | 28 | 40 | 52 | 4 | 8.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 30 FT | 8 | 8 | 8 | 8 | 4 | 11 | 4 | 10.5 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 18.0 | 18.0 | 4 | 9 | 4 | 9.5 | 24.1 | 28 | 40 | 52 | 4 | 8 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 32 FT | 8 | 9 | 8 | 8 | 4 | 10.5 | 4 | 9.5 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 23 | 21.0 | 22.0 | 4 | 23 | 18.0 | 18.0 | 4 | 9.5 | 4 | 12 | 24.5 | 29 | 41 | 53 | 4 | 9.5 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 34 FT | 8 | 9 | 8 | 8 | 4 | 10 | 4 | 9 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 22 | 21.0 | 22.0 | 4 | 22 | 18.0 | 18.0 | 4 | 9 | 4 | 11 | 24.4 | 29 | 41 | 53 | 4 | 9 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 36 FT | 8 | 9 | 8 | 8 | 4 | 9.5 | 4 | 8.5 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 21 | 21.0 | 22.0 | 4 | 21 | 18.0 | 18.0 | 4 | 8.5 | 4 | 10.5 | 24.4 | 29 | 41 | 53 | 4 | 8.5 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 38 FT | 8 | 9 | 8 | 8 | 4 | 9 | 4 | 8 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 20 | 21.0 | 22.0 | 4 | 20 | 18.0 | 18.0 | 4 | 8 | 4 | 10 | 24.4 | 29 | 41 | 53 | 4 | 8.5 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 40 FT | 8 | 10 | 8 | 8 | 4 | 8.5 | 4 | 7.5 | 24.5 | 24.0 | 24.0 | 24.0 | 4 | 19 | 21.0 | 22.0 | 4 | 19 | 18.0 | 18.0 | 4 | 8.5 | 4 | 12 | 24.8 | 30 | 42 | 54 | 4 | 9 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 42 FT | 9 | 10 | 8 | 8 | 4 | 9 | 4 | 9 | 24.8 | 25.0 | 25.0 | 25.0 | 4 | 21 | 21.0 | 23.0 | 4 | 21 | 17.0 | 18.0 | 4 | 8 | 4 | 11.5 | 24.8 | 30 | 42 | 54 | 4 | 9 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 44 FT | 9 | 10 | 8 | 8 | 4 | 8.5 | 4 | 8.5 | 24.8 | 25.0 | 25.0 | 25.0 | 4 | 20 | 21.0 | 23.0 | 4 | 20 | 17.0 | 18.0 | 4 | 8 | 4 | 11 | 24.8 | 30 | 42 | 54 | 4 | 9 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 46 FT | 9 | 10 | 8 | 8 | 4 | 8 | 4 | 8 | 24.8 | 25.0 | 25.0 | 25.0 | 4 | 19 | 21.0 | 23.0 | 4 | 19 | 17.0 | 18.0 | 4 | 7.5 | 4 | 10.5 | 24.8 | 30 | 42 | 54 | 4 | 8.5 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 48 FT | 9 | 11 | 8 | 8 | 4 | 8 | 4 | 7.5 | 24.9 | 25.0 | 25.0 | 25.0 | 4 | 19 | 21.0 | 22.0 | 4 | 19 | 18.0 | 18.0 | 4 | 8 | 4 | 10.5 | 25.0 | 31 | 43 | 55 | 4 | 9.5 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 50 FT | 10 | 11 | 8 | 8 | 4 | 8 | 4 | 8 | 25.1 | 26.0 | 26.0 | 26.0 | 4 | 20 | 21.0 | 23.0 | 4 | 20 | 17.0 | 18.0 | 4 | 7.5 | 4 | 10.5 | 25.1 | 31 | 43 | 55 | 4 | 9 | 21.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |

| SPAN (S) = 3 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|------|---------|------|------|------|---------|------|------|------|------------------|----|---------|-------|------|------|---------|------|------|------|---------|----------------------------|---------|------|----|--|-----------|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 26.8 | 26.0 | 26.0 | 4 | 24 | 39.5 | 30.5 | 4 | 24 | 21.0 | 20.0 | 4 | 12 | 4 | 11.5 | 36.0 | 64 | 76 | 4 | 12 | 34.0 | 25.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 8.5 | 4 | 10.5 | 26.8 | 26.0 | 26.0 | 4 | 24 | 39.5 | 30.5 | 4 | 24 | 20.0 | 20.0 | 4 | 12 | 4 | 11 | 36.0 | 64 | 76 | 4 | 12 | 34.0 | 24.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.8 | 24.0 | 24.0 | 4 | 24 | 39.5 | 34.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 10 | 36.0 | 64 | 76 | 4 | 12 | 34.0 | 24.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.8 | 24.0 | 24.0 | 4 | 24 | 39.5 | 26.0 | 4 | 24 | 18.0 | 19.0 | 4 | 12 | 4 | 9.5 | 36.0 | 64 | 76 | 4 | 12 | 34.0 | 23.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.8 | 24.0 | 24.0 | 4 | 24 | 39.5 | 24.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 9 | 36.0 | 64 | 76 | 4 | 12 | 24.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.8 | 24.0 | 24.0 | 4 | 24 | 39.5 | 23.0 | 4 | 24 | 18.0 | 18.0 | 4 | 12 | 4 | 8.5 | 36.0 | 64 | 76 | 4 | 12 | 23.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 34.9 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 12 | 4 | 9 | 34.4 | 64 | 76 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 34.5 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 12 | 4 | 8.5 | 34.1 | 64 | 76 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 10 | 34.3 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 12 | 4 | 8 | 33.9 | 64 | 76 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 9 | 34.0 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 12 | 4 | 7.5 | 33.8 | 64 | 76 | 4 | 12 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 8 | 33.8 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 12 | 4 | 7 | 33.6 | 64 | 76 | 4 | 11.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 7.5 | 33.6 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 12 | 4 | 6.5 | 33.5 | 64 | 76 | 4 | 10.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 7 | 33.5 | 24.0 | 24.0 | 4 | 24 | 22.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 11.5 | 4 | 6 | 33.4 | 64 | 76 | 4 | 10.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 6.5 | 33.4 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 10.5 | 5 | 6.5 | 33.3 | 64 | 76 | 4 | 10 | 22.0 | 22.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 6 | 33.3 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 10 | 5 | 6 | 33.1 | 64 | 76 | 4 | 9.5 | 22.0 | 22.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 8 | 8 | 9 | 8 | 4 | 11.5 | 4 | 6.5 | 32.3 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 9.5 | 4 | 6 | 32.1 | 64 | 76 | 4 | 9 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 8 | 9 | 9 | 8 | 4 | 11 | 4 | 6.5 | 32.1 | 24.0 | 24.0 | 4 | 24 | 21.0 | 22.0 | 4 | 24 | 17.0 | 18.0 | 4 | 10 | 4 | 6.5 | 34.1 | 65 | 77 | 4 | 10.5 | 22.0 | 23.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 8 | 9 | 9 | 8 | 4 | 10 | 4 | 6 | 32.0 | 24.0 | 24.0 | 4 | 23 | 21.0 | 22.0 | 4 | 23 | 17.0 | 18.0 | 4 | 9.5 | 4 | 6 | 34.0 | 65 | 77 | 4 | 10 | 22.0 | 23.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | |
| 36 FT | 8 | 9 | 9 | 8 | 4 | 9.5 | 5 | 7 | 32.0 | 24.0 | 24.0 | 4 | 22 | 21.0 | 22.0 | 4 | 22 | 17.0 | 18.0 | 4 | 9 | 4 | 6 | 34.0 | 65 | 77 | 4 | 10 | 22.0 | 23.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | |
| 38 FT | 8 | 9 | 9 | 8 | 4 | 9 | 5 | 6.5 | 32.0 | 24.0 | 28.0 | 4 | 21 | 21.0 | 22.0 | 4 | 21 | 17.0 | 18.0 | 4 | 8.5 | 5 | 7 | 34.0 | 65 | 77 | 4 | 9.5 | 22.0 | 23.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |
| 40 FT | 8 | 10 | 9 | 8 | 4 | 8.5 | 5 | 6 | 31.9 | 24.0 | 24.0 | 4 | 20 | 21.0 | 22.0 | 4 | 20 | 17.0 | 18.0 | 4 | 9 | 4 | 6 | 35.5 | 66 | 78 | 4 | 10.5 | 23.0 | 23.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |
| 42 FT | 9 | 10 | 9 | 8 | 4 | 9.5 | 5 | 6.5 | 33.4 | 25.0 | 29.0 | 4 | 22 | 21.0 | 22.0 | 4 | 22 | 17.0 | 18.0 | 4 | 9 | 5 | 7 | 35.3 | 66 | 78 | 4 | 10 | 23.0 | 23.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 44 FT | 9 | 10 | 9 | 8 | 4 | 9 | 5 | 6.5 | 33.3 | 25.0 | 29.0 | 4 | 21 | 21.0 | 22.0 | 4 | 21 | 17.0 | 18.0 | 4 | 8.5 | 5 | 6.5 | 35.3 | 66 | 78 | 4 | 10 | 23.0 | 23.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 46 FT | 9 | 10 | 9 | 8 | 4 | 8.5 | 5 | 6 | 33.3 | 25.0 | 29.0 | 4 | 21 | 21.0 | 22.0 | 4 | 21 | 17.0 | 18.0 | 4 | 8 | 5 | 6.5 | 35.1 | 66 | 78 | 4 | 9.5 | 23.0 | 23.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 48 FT | 9 | 11 | 9 | 8 | 4 | 8 | 5 | 6 | 33.1 | 25.0 | 29.0 | 4 | 20 | 21.0 | 22.0 | 4 | 20 | 17.0 | 18.0 | 4 | 8.5 | 5 | 6.5 | 36.4 | 67 | 79 | 4 | 10 | 23.0 | 23.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 50 FT | 9 | 11 | 9 | 8 | 4 | 7.5 | 5 | 6 | 33.1 | 25.0 | 29.0 | 4 | 19 | 21.0 | 22.0 | 4 | 19 | 17.0 | 18.0 | 4 | 8.5 | 5 | 6.5 | 36.4 | 67 | 79 | 4 | 10 | 23.0 | 23.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |

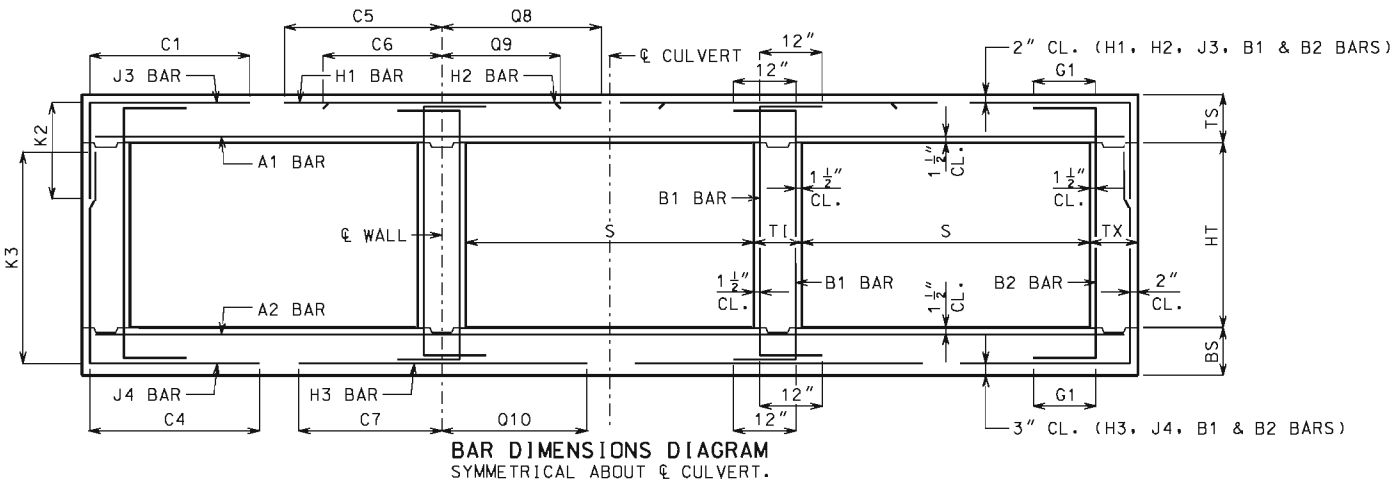
| SPAN (S) = 4 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 2 FT OR 3 FT | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|---------|----------------------------|------|------|----|--|-----------|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=2' | HT=3' | | | | | | | | | | | | | | HT=2' | HT=3' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 30.3 | 26.0 | 26.0 | 4 | 24 | 47.5 | 36.5 | 4 | 24 | 21.0 | 20.0 | 4 | 12 | 4 | 12 | 29.4 | 28 | 40 | 4 | 12 | 27.0 | 28.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 30.3 | 26.0 | 26.0 | 4 | 24 | 47.5 | 36.5 | 4 | 24 | 21.0 | 20.0 | 4 | 12 | 4 | 12 | 27.3 | 28 | 40 | 4 | 11.5 | 27.0 | 27.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 28.6 | 24.0 | 24.0 | 4 | 24 | 33.0 | 36.0 | 4 | 24 | 20.0 | 20.0 | 4 | 12 | 4 | 12 | 25.0 | 28 | 40 | 4 | 11.5 | 26.0 | 27.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 26.0 | 24.0 | 24.0 | 4 | 24 | 28.0 | 29.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 12 | 24.1 | 28 | 40 | 4 | 10.5 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.8 | 24.0 | 24.0 | 4 | 24 | 26.0 | 28.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 12 | 23.5 | 28 | 40 | 4 | 10 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 24.1 | 24.0 | 24.0 | 4 | 24 | 26.0 | 27.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 12 | 23.1 | 28 | 40 | 4 | 9 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 23.6 | 24.0 | 24.0 | 4 | 23 | 25.0 | 26.0 | 4 | 23 | 18.0 | 19.0 | 4 | 12 | 4 | 12 | 22.9 | 28 | 40 | 4 | 8 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 23.4 | 24.0 | 24.0 | 4 | 22 | 25.0 | 26.0 | 4 | 22 | 18.0 | 18.0 | 4 | 11 | 4 | 12 | 22.6 | 28 | 40 | 4 | 7.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 22.5 | 24.0 | 24.0 | 4 | 21 | 24.0 | 25.0 | 4 | 21 | 18.0 | 18.0 | 4 | 10.5 | 4 | 12 | 22.1 | 28 | 40 | 4 | 7.5 | 24.0 | 25.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 11.5 | 4 | 12 | 22.5 | 24.0 | 24.0 | 4 | 20 | 24.0 | 25.0 | 4 | 20 | 18.0 | 18.0 | 4 | 9.5 | 4 | 10.5 | 22.1 | 28 | 40 | 4 | 7 | 24.0 | 25.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 10.5 | 4 | 11 | 22.4 | 24.0 | 24.0 | 4 | 18 | 24.0 | 25.0 | 4 | 18 | 18.0 | 18.0 | 4 | 8.5 | 4 | 9.5 | 22.1 | 28 | 40 | 4 | 6.5 | 24.0 | 25.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 8 | 8 | 8 | 8 | 4 | 9.5 | 4 | 10 | 22.4 | 24.0 | 24.0 | 4 | 17 | 24.0 | 25.0 | 4 | 17 | 18.0 | 18.0 | 4 | 7.5 | 4 | 9 | 22.0 | 28 | 40 | 4 | 6 | 24.0 | 25.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 8 | 9 | 8 | 8 | 4 | 8.5 | 4 | 9 | 22.6 | 24.0 | 24.0 | 4 | 15 | 24.0 | 25.0 | 4 | 15 | 18.0 | 18.0 | 4 | 8 | 4 | 11.5 | 21.4 | 29 | 41 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 8.5 | 22.5 | 24.0 | 24.0 | 4 | 14 | 24.0 | 25.0 | 4 | 14 | 18.0 | 18.0 | 4 | 7 | 4 | 11 | 21.4 | 29 | 41 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 8 | 10 | 8 | 8 | 4 | 7.5 | 4 | 8 | 22.8 | 24.0 | 24.0 | 4 | 13 | 24.0 | 25.0 | 4 | 13 | 18.0 | 18.0 | 4 | 7.5 | 4 | 12 | 20.9 | 30 | 42 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 9 | 10 | 8 | 8 | 4 | 7.5 | 4 | 10 | 22.1 | 25.0 | 25.0 | 4 | 15 | 24.0 | 26.0 | 4 | 15 | 18.0 | 18.0 | 4 | 7 | 4 | 12 | 21.0 | 30 | 42 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 9 | 10 | 8 | 8 | 4 | 7 | 4 | 9.5 | 22.1 | 25.0 | 25.0 | 4 | 14 | 24.0 | 26.0 | 4 | 14 | 18.0 | 18.0 | 4 | 6 | 4 | 12 | 21.0 | 30 | 42 | 4 | 6 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 4 | 9 | 22.3 | 25.0 | 25.0 | 4 | 13 | 24.0 | 26.0 | 4 | 13 | 18.0 | 18.0 | 4 | 6.5 | 4 | 10.5 | 20.6 | 31 | 43 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 36 FT | 10 | 11 | 8 | 8 | 4 | 7 | 4 | 10 | 21.9 | 26.0 | 26.0 | 4 | 14 | 24.0 | 26.0 | 4 | 14 | 18.0 | 19.0 | 4 | 6.5 | 4 | 10.5 | 20.9 | 31 | 43 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 38 FT | 10 | 12 | 8 | 8 | 4 | 6.5 | 4 | 9.5 | 22.0 | 26.0 | 26.0 | 4 | 13 | 24.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6.5 | 4 | 9.5 | 20.5 | 32 | 44 | 4 | 7.5 | 24.0 | 27.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 40 FT | 10 | 12 | 8 | 8 | 4 | 6 | 4 | 9 | 22.0 | 26.0 | 26.0 | 4 | 13 | 24.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6.5 | 4 | 9.5 | 20.5 | 32 | 44 | 4 | 7 | 24.0 | 27.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 42 FT | 11 | 12 | 8 | 8 | 4 | 6.5 | 4 | 9.5 | 21.6 | 27.0 | 27.0 | 4 | 14 | 23.0 | 26.0 | 4 | 14 | 18.0 | 19.0 | 4 | 6 | 4 | 9.5 | 20.8 | 32 | 44 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 44 FT | 11 | 12 | 8 | 8 | 4 | 6 | 4 | 9.5 | 21.6 | 27.0 | 27.0 | 4 | 13 | 23.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6 | 4 | 9.5 | 20.8 | 32 | 44 | 4 | 6 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 46 FT | 11 | 13 | 8 | 8 | 4 | 6 | 4 | 8.5 | 21.8 | 27.0 | 27.0 | 4 | 12 | 23.0 | 26.0 | 4 | 12 | 18.0 | 19.0 | 4 | 6 | 4 | 8.5 | 20.5 | 33 | 45 | 4 | 6.5 | 23.0 | 27.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 48 FT | 12 | 13 | 8 | 8 | 4 | 6 | 4 | 8.5 | 21.5 | 28.0 | 28.0 | 4 | 13 | 23.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6 | 4 | 8.5 | 20.8 | 33 | 45 | 4 | 6.5 | 24.0 | 27.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 50 FT | 12 | 13 | 8 | 8 | 5 | 9 | 4 | 8.5 | 21.5 | 28.0 | 28.0 | 4 | 13 | 23.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 5 | 8.5 | 4 | 8.5 | 20.8 | 33 | 45 | 4 | 6 | 24.0 | 27.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |

| SPAN (S) = 4 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|-----------|----------------------------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=4' | HT=5' | | | | | | | | | | | | | | HT=4' | HT=5' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 30.3 | 26.0 | 26.0 | 4 | 24 | 47.5 | 36.5 | 4 | 24 | 21.0 | 21.0 | 4 | 12 | 4 | 12 | 42.0 | 52 | 64 | 4 | 12 | 28.0 | 28.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 10 | 8 | 8 | 8 | 4 | 7 | 4 | 10.5 | 30.3 | 26.0 | 26.0 | 4 | 24 | 47.5 | 36.5 | 4 | 24 | 21.0 | 21.0 | 4 | 12 | 4 | 12 | 39.1 | 52 | 64 | 4 | 11 | 27.0 | 28.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 30.3 | 24.0 | 24.0 | 4 | 24 | 47.5 | 37.0 | 4 | 24 | 20.0 | 20.0 | 4 | 12 | 4 | 12 | 34.8 | 52 | 64 | 4 | 11 | 26.0 | 27.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 34.6 | 24.0 | 24.0 | 4 | 24 | 29.0 | 30.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 11.5 | 32.1 | 52 | 64 | 4 | 10.5 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 31.4 | 24.0 | 24.0 | 4 | 24 | 27.0 | 28.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 11 | 30.3 | 52 | 64 | 4 | 9.5 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 29.9 | 24.0 | 24.0 | 4 | 24 | 26.0 | 27.0 | 4 | 24 | 19.0 | 19.0 | 4 | 12 | 4 | 10.5 | 29.3 | 52 | 64 | 4 | 9 | 25.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 29.1 | 24.0 | 24.0 | 4 | 24 | 25.0 | 27.0 | 4 | 24 | 18.0 | 19.0 | 4 | 11.5 | 4 | 10 | 28.5 | 52 | 64 | 4 | 8.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 28.5 | 24.0 | 24.0 | 4 | 23 | 25.0 | 26.0 | 4 | 23 | 18.0 | 19.0 | 4 | 10.5 | 4 | 9.5 | 28.1 | 52 | 64 | 4 | 7.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 11 | 26.9 | 24.0 | 24.0 | 4 | 22 | 24.0 | 26.0 | 4 | 22 | 18.0 | 19.0 | 4 | 10 | 4 | 9.5 | 26.6 | 52 | 64 | 4 | 7.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 8 | 8 | 8 | 4 | 11 | 4 | 10 | 26.8 | 24.0 | 24.0 | 4 | 21 | 24.0 | 26.0 | 4 | 21 | 18.0 | 19.0 | 4 | 9 | 4 | 8.5 | 26.5 | 52 | 64 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 8 | 8 | 8 | 4 | 10 | 4 | 9 | 26.8 | 24.0 | 24.0 | 4 | 19 | 24.0 | 26.0 | 4 | 19 | 18.0 | 19.0 | 4 | 8 | 4 | 8 | 26.4 | 52 | 64 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 8 | 8 | 8 | 8 | 4 | 9 | 4 | 8 | 26.6 | 24.0 | 24.0 | 4 | 17 | 24.0 | 26.0 | 4 | 17 | 18.0 | 18.0 | 4 | 7 | 4 | 7 | 26.4 | 52 | 64 | 4 | 6 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 8 | 9 | 8 | 8 | 4 | 8.5 | 4 | 7.5 | 26.6 | 24.0 | 24.0 | 4 | 16 | 24.0 | 25.0 | 4 | 16 | 18.0 | 18.0 | 4 | 7.5 | 4 | 8.5 | 26.6 | 53 | 65 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 7 | 26.6 | 24.0 | 24.0 | 4 | 14 | 24.0 | 25.0 | 4 | 14 | 18.0 | 18.0 | 4 | 7 | 4 | 8 | 26.5 | 53 | 65 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 8 | 10 | 8 | 8 | 4 | 7.5 | 4 | 6 | 26.6 | 24.0 | 24.0 | 4 | 13 | 24.0 | 25.0 | 4 | 13 | 18.0 | 18.0 | 4 | 7.5 | 4 | 9.5 | 26.8 | 54 | 66 | 4 | 7.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 9 | 10 | 8 | 8 | 4 | 7.5 | 4 | 7.5 | 26.9 | 25.0 | 25.0 | 4 | 15 | 24.0 | 26.0 | 4 | 15 | 18.0 | 19.0 | 4 | 7 | 4 | 9 | 26.9 | 54 | 66 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 9 | 10 | 8 | 8 | 4 | 7 | 4 | 7 | 26.9 | 25.0 | 25.0 | 4 | 14 | 24.0 | 26.0 | 4 | 14 | 18.0 | 19.0 | 4 | 6 | 4 | 8 | 26.8 | 54 | 66 | 4 | 6 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 4 | 6.5 | 26.9 | 25.0 | 25.0 | 4 | 13 | 24.0 | 26.0 | 4 | 13 | 18.0 | 18.0 | 4 | 6.5 | 4 | 8.5 | 27.0 | 55 | 67 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 36 FT | 10 | 11 | 8 | 8 | 4 | 7 | 4 | 6.5 | 27.1 | 26.0 | 26.0 | 4 | 14 | 23.0 | 26.0 | 4 | 14 | 18.0 | 19.0 | 4 | 6.5 | 4 | 8 | 27.1 | 55 | 67 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 38 FT | 10 | 12 | 8 | 8 | 4 | 6.5 | 4 | 6 | 27.3 | 26.0 | 26.0 | 4 | 14 | 23.0 | 26.0 | 4 | 14 | 18.0 | 19.0 | 4 | 6.5 | 4 | 8 | 27.4 | 56 | 68 | 4 | 7.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 40 FT | 10 | 12 | 8 | 8 | 4 | 6 | 5 | 8 | 27.1 | 26.0 | 26.0 | 4 | 13 | 23.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6.5 | 4 | 7.5 | 27.4 | 56 | 68 | 4 | 7 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 42 FT | 11 | 12 | 8 | 8 | 4 | 6.5 | 5 | 9 | 27.4 | 27.0 | 27.0 | 4 | 14 | 23.0 | 26.0 | 4 | 14 | 18.0 | 19.0 | 4 | 6 | 4 | 7 | 27.4 | 56 | 68 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 44 FT | 11 | 12 | 8 | 8 | 4 | 6 | 5 | 8.5 | 27.4 | 27.0 | 27.0 | 4 | 13 | 23.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6 | 4 | 6.5 | 27.4 | 56 | 68 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 46 FT | 11 | 13 | 8 | 8 | 4 | 6 | 5 | 8.5 | 27.5 | 27.0 | 27.0 | 4 | 13 | 23.0 | 26.0 | 4 | 13 | 18.0 | 19.0 | 4 | 6 | 4 | 7 | 27.6 | 57 | 69 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 48 FT | 12 | 13 | 8 | 8 | 4 | 6 | 5 | 8.5 | 27.6 | 28.0 | 28.0 | 4 | 14 | 23.0 | 25.0 | 4 | 14 | 18.0 | 18.0 | 4 | 6 | 4 | 6.5 | 27.8 | 57 | 69 | 4 | 6.5 | 24.0 | 26.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | |
| 50 FT | 12 | 13 | 8 | 8 | 4 | 6 | 5 | 8.5 | 27.6 | 28.0 | 28.0 | 4 | 13 | 23.0 | 25.0 | 4 | 13 | 18.0 | 18.0 | 5 | 9 | 4 | 6 | 27.8 | 57 | 69 | 4 | 6 | 24.0 | 26.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 3 FT OR 4 FT | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|---------|----------------------------|-----------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=3' | HT=4' | | | | | | | | | | | | | | HT=3' | HT=4' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 10 | 8 | 8 | 8 | 5 | 9 | 4 | 10.5 | 33.9 | 26.0 | 26.0 | 4 | 19 | 56.5 | 42.5 | 4 | 19 | 22.0 | 21.0 | 4 | 12 | 4 | 12 | 33.9 | 40 | 52 | 4 | 8.5 | 30.0 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9.5 | 33.9 | 27.0 | 27.0 | 4 | 21 | 56.5 | 42.5 | 4 | 21 | 22.0 | 21.0 | 4 | 12 | 4 | 12 | 31.1 | 40 | 52 | 4 | 8.5 | 30.0 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 10.5 | 4 | 12 | 32.1 | 24.0 | 24.0 | 4 | 20 | 38.0 | 46.0 | 4 | 20 | 20.0 | 20.0 | 4 | 12 | 4 | 12 | 28.4 | 40 | 52 | 4 | 8.5 | 29.0 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 29.3 | 24.0 | 24.0 | 4 | 21 | 31.0 | 34.0 | 4 | 21 | 20.0 | 20.0 | 4 | 12 | 4 | 12 | 27.0 | 40 | 52 | 4 | 8 | 28.0 | 29.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 12 | 27.5 | 24.0 | 24.0 | 4 | 20 | 30.0 | 31.0 | 4 | 20 | 19.0 | 19.0 | 4 | 11 | 4 | 11 | 26.3 | 40 | 52 | 4 | 7 | 28.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 11 | 4 | 12 | 26.6 | 24.0 | 24.0 | 4 | 18 | 29.0 | 30.0 | 4 | 18 | 19.0 | 19.0 | 4 | 9.5 | 4 | 10.5 | 25.6 | 40 | 52 | 4 | 6.5 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 10 | 4 | 10.5 | 26.1 | 24.0 | 24.0 | 4 | 16 | 28.0 | 30.0 | 4 | 16 | 19.0 | 19.0 | 4 | 8 | 4 | 9.5 | 25.3 | 40 | 52 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 8.5 | 4 | 9.5 | 25.6 | 24.0 | 24.0 | 4 | 14 | 28.0 | 29.0 | 4 | 14 | 19.0 | 19.0 | 4 | 7 | 4 | 8.5 | 25.0 | 40 | 52 | 5 | 7 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 8.5 | 25.6 | 24.0 | 24.0 | 4 | 13 | 28.0 | 29.0 | 4 | 13 | 19.0 | 19.0 | 4 | 7 | 4 | 11 | 24.3 | 41 | 53 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 8 | 8 | 4 | 7.5 | 4 | 8 | 24.8 | 24.0 | 24.0 | 4 | 12 | 27.0 | 28.0 | 4 | 12 | 19.0 | 19.0 | 4 | 7 | 4 | 10.5 | 23.5 | 41 | 53 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 9 | 8 | 8 | 4 | 7 | 4 | 7.5 | 24.6 | 24.0 | 24.0 | 5 | 17 | 27.0 | 28.0 | 5 | 17 | 19.0 | 19.0 | 4 | 6 | 4 | 9.5 | 23.5 | 41 | 53 | 5 | 7 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 9 | 10 | 8 | 8 | 4 | 7 | 4 | 9 | 24.3 | 25.0 | 25.0 | 4 | 12 | 27.0 | 29.0 | 4 | 12 | 19.0 | 19.0 | 4 | 6.5 | 4 | 12 | 23.1 | 42 | 54 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 9 | 11 | 8 | 8 | 4 | 6.5 | 4 | 8 | 24.4 | 25.0 | 25.0 | 5 | 17 | 27.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 4 | 6.5 | 4 | 10.5 | 22.6 | 43 | 55 | 4 | 6 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 8 | 8 | 4 | 6.5 | 4 | 8.5 | 23.9 | 26.0 | 26.0 | 5 | 18 | 26.0 | 29.0 | 5 | 18 | 19.0 | 19.0 | 4 | 6 | 4 | 10.5 | 22.9 | 43 | 55 | 5 | 8 | 26.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 10 | 11 | 8 | 8 | 4 | 6 | 4 | 8 | 23.9 | 26.0 | 26.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 5 | 8.5 | 4 | 10.5 | 22.9 | 43 | 55 | 5 | 8 | 26.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 10 | 12 | 8 | 8 | 5 | 8 | 4 | 7 | 24.0 | 26.0 | 26.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 9 | 4 | 9.5 | 22.5 | 44 | 56 | 5 | 8.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 11 | 12 | 8 | 8 | 5 | 9 | 4 | 8 | 23.6 | 27.0 | 27.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 5 | 8.5 | 4 | 9.5 | 22.8 | 44 | 56 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 11 | 13 | 8 | 8 | 5 | 8.5 | 4 | 7 | 23.8 | 27.0 | 27.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 8.5 | 4 | 8.5 | 22.5 | 45 | 57 | 5 | 8.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 36 FT | 12 | 13 | 8 | 8 | 5 | 8.5 | 4 | 8 | 23.5 | 28.0 | 28.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 5 | 8 | 4 | 8.5 | 22.8 | 45 | 57 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 38 FT | 12 | 14 | 8 | 8 | 5 | 8 | 4 | 7 | 23.6 | 28.0 | 28.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 8 | 4 | 7.5 | 22.6 | 46 | 58 | 5 | 8.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 40 FT | 13 | 14 | 8 | 8 | 5 | 8 | 4 | 7.5 | 23.4 | 29.0 | 29.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 8 | 4 | 7.5 | 22.8 | 46 | 58 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 42 FT | 13 | 14 | 8 | 8 | 5 | 7.5 | 4 | 7.5 | 23.4 | 29.0 | 29.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 7.5 | 4 | 7.5 | 22.8 | 46 | 58 | 5 | 7.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 44 FT | 13 | 15 | 8 | 8 | 5 | 7.5 | 4 | 7 | 23.6 | 29.0 | 29.0 | 5 | 15 | 26.0 | 29.0 | 5 | 15 | 19.0 | 19.0 | 5 | 7.5 | 4 | 7 | 22.8 | 47 | 59 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 46 FT | 14 | 15 | 8 | 8 | 5 | 7.5 | 4 | 7 | 23.4 | 30.0 | 30.0 | 5 | 16 | 25.0 | 29.0 | 5 | 16 | 18.0 | 19.0 | 5 | 7.5 | 4 | 7 | 22.9 | 47 | 59 | 5 | 7.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 48 FT | 14 | 15 | 8 | 8 | 5 | 7 | 4 | 7 | 23.4 | 30.0 | 30.0 | 5 | 15 | 25.0 | 29.0 | 5 | 15 | 18.0 | 19.0 | 5 | 7 | 4 | 7 | 22.9 | 47 | 59 | 5 | 7 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 50 FT | 14 | 16 | 8 | 8 | 5 | 7 | 4 | 6.5 | 23.6 | 30.0 | 30.0 | 5 | 15 | 25.0 | 29.0 | 5 | 15 | 18.0 | 19.0 | 5 | 7 | 4 | 6.5 | 22.9 | 48 | 60 | 5 | 7.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|-----------|----------------------------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | | | | | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9.5 | 33.9 | 27.0 | 27.0 | 4 | 22 | 56.5 | 42.5 | 4 | 22 | 23.0 | 23.0 | 4 | 12 | 4 | 10 | 47.5 | 64 | 76 | 4 | 8.5 | 31.0 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9.5 | 33.9 | 27.0 | 27.0 | 4 | 21 | 56.5 | 42.5 | 4 | 21 | 22.0 | 22.0 | 4 | 11 | 4 | 9.5 | 42.8 | 64 | 76 | 4 | 8 | 30.0 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 10 | 4 | 10 | 33.9 | 24.0 | 24.0 | 4 | 20 | 56.5 | 46.0 | 4 | 20 | 21.0 | 21.0 | 4 | 12 | 4 | 9 | 38.9 | 64 | 76 | 4 | 8.5 | 29.0 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 10.5 | 38.3 | 24.0 | 24.0 | 4 | 21 | 33.0 | 35.0 | 4 | 21 | 20.0 | 20.0 | 4 | 12 | 4 | 8.5 | 35.5 | 64 | 76 | 4 | 7.5 | 28.0 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 10 | 34.4 | 24.0 | 24.0 | 4 | 20 | 30.0 | 31.0 | 4 | 20 | 19.0 | 20.0 | 4 | 10.5 | 4 | 8 | 33.5 | 64 | 76 | 4 | 7 | 28.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 10.5 | 4 | 9 | 32.9 | 24.0 | 24.0 | 4 | 18 | 29.0 | 30.0 | 4 | 18 | 19.0 | 19.0 | 4 | 9 | 4 | 7.5 | 32.3 | 64 | 76 | 4 | 6.5 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 8 | 8 | 4 | 9.5 | 4 | 8 | 31.9 | 24.0 | 24.0 | 4 | 16 | 28.0 | 30.0 | 4 | 16 | 19.0 | 19.0 | 4 | 7.5 | 4 | 7 | 31.3 | 64 | 76 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 8 | 8 | 8 | 4 | 8.5 | 4 | 7 | 31.1 | 24.0 | 24.0 | 4 | 14 | 28.0 | 29.0 | 4 | 14 | 19.0 | 19.0 | 4 | 7 | 4 | 6 | 30.8 | 64 | 76 | 5 | 7 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 9 | 8 | 8 | 4 | 8 | 4 | 6.5 | 30.8 | 24.0 | 24.0 | 4 | 13 | 28.0 | 29.0 | 4 | 13 | 19.0 | 19.0 | 4 | 7 | 4 | 7 | 30.9 | 65 | 77 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 8 | 8 | 4 | 7.5 | 4 | 6.5 | 29.1 | 24.0 | 24.0 | 4 | 12 | 27.0 | 28.0 | 4 | 12 | 19.0 | 19.0 | 4 | 6.5 | 4 | 7 | 29.1 | 65 | 77 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 8 | 9 | 8 | 8 | 4 | 7 | 5 | 7 | 29.0 | 24.0 | 24.0 | 5 | 17 | 27.0 | 28.0 | 5 | 17 | 19.0 | 19.0 | 4 | 6 | 4 | 6.5 | 29.0 | 65 | 77 | 5 | 7.5 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 22 FT | 9 | 10 | 8 | 8 | 4 | 7 | 4 | 6.5 | 29.1 | 25.0 | 25.0 | 4 | 12 | 26.0 | 29.0 | 4 | 12 | 19.0 | 19.0 | 4 | 6 | 4 | 7.5 | 29.3 | 66 | 78 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 24 FT | 9 | 10 | 8 | 8 | 4 | 6.5 | 4 | 6 | 29.1 | 25.0 | 25.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 5 | 8.5 | 4 | 7 | 29.1 | 66 | 78 | 5 | 7.5 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 26 FT | 10 | 11 | 8 | 8 | 4 | 6.5 | 5 | 8 | 29.4 | 26.0 | 26.0 | 4 | 12 | 26.0 | 29.0 | 4 | 12 | 19.0 | 19.0 | 4 | 6 | 4 | 6.5 | 29.4 | 67 | 79 | 5 | 8.5 | 26.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 28 FT | 10 | 11 | 8 | 8 | 4 | 6 | 5 | 7.5 | 29.3 | 26.0 | 26.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 5 | 8.5 | 4 | 6 | 29.4 | 67 | 79 | 5 | 8 | 26.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 30 FT | 10 | 12 | 8 | 8 | 5 | 8.5 | 5 | 7.5 | 29.3 | 26.0 | 26.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 9 | 4 | 6 | 29.5 | 68 | 80 | 5 | 8.5 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 32 FT | 11 | 12 | 8 | 8 | 5 | 9 | 5 | 8 | 29.5 | 27.0 | 31.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 19.0 | 19.0 | 5 | 8.5 | 5 | 8 | 29.6 | 68 | 80 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 34 FT | 11 | 13 | 8 | 8 | 5 | 8.5 | 5 | 7.5 | 29.5 | 27.0 | 31.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 19.0 | 19.0 | 5 | 8.5 | 5 | 8.5 | 29.8 | 69 | 81 | 5 | 8.5 | 26.0 | 30.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | |
| 36 FT | 12 | 13 | 8 | 8 | 5 | 8.5 | 5 | 8 | 29.8 | 28.0 | 32.0 | 5 | 17 | 26.0 | 29.0 | 5 | 17 | 18.0 | 19.0 | 5 | 8 | 5 | 8 | 29.9 | 69 | 81 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | |
| 38 FT | 12 | 14 | 8 | 8 | 5 | 8 | 5 | 7.5 | 29.8 | 28.0 | 32.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 18.0 | 19.0 | 5 | 8.5 | 5 | 8.5 | 30.1 | 70 | 82 | 5 | 8.5 | 26.0 | 30.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |
| 40 FT | 12 | 14 | 8 | 8 | 5 | 7.5 | 5 | 7 | 29.8 | 28.0 | 32.0 | 5 | 15 | 26.0 | 29.0 | 5 | 15 | 18.0 | 19.0 | 5 | 8 | 5 | 8 | 30.0 | 70 | 82 | 5 | 8 | 26.0 | 30.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 42 FT | 13 | 14 | 8 | 8 | 5 | 8 | 5 | 7.5 | 29.9 | 29.0 | 33.0 | 5 | 16 | 26.0 | 29.0 | 5 | 16 | 18.0 | 19.0 | 5 | 7.5 | 5 | 7.5 | 30.1 | 70 | 82 | 5 | 7.5 | 26.0 | 30.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 44 FT | 13 | 15 | 8 | 8 | 5 | 7.5 | 5 | 7 | 30.0 | 29.0 | 33.0 | 5 | 15 | 26.0 | 29.0 | 5 | 15 | 18.0 | 19.0 | 5 | 8 | 5 | 8 | 30.4 | 71 | 83 | 5 | 8 | 27.0 | 30.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 46 FT | 14 | 15 | 8 | 8 | 5 | 7.5 | 5 | 6.5 | 30.1 | 30.0 | 34.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 18.0 | 19.0 | 5 | 7.5 | 5 | 7.5 | 30.5 | 71 | 83 | 5 | 7.5 | 27.0 | 30.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 48 FT | 14 | 15 | 9 | 8 | 5 | 7.5 | 5 | 8 | 30.6 | 30.0 | 34.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 18.0 | 19.0 | 5 | 7.5 | 5 | 8 | 30.8 | 71 | 83 | 5 | 7.5 | 27.0 | 30.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 50 FT | 14 | 16 | 9 | 8 | 5 | 7 | 5 | 7.5 | 30.8 | 30.0 | 34.0 | 5 | 15 | 26.0 | 28.0 | 5 | 15 | 18.0 | 19.0 | 5 | 7.5 | 5 | 8 | 31.0 | 72 | 84 | 5 | 7.5 | 27.0 | 30.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |

| SPAN (S) = 5 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|---------|----------------------------|-----------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 9 | 33.9 | 27.0 | 27.0 | 4 | 22 | 56.5 | 42.5 | 4 | 22 | 23.0 | 23.0 | 4 | 11 | 4 | 7 | 48.0 | 88 | 100 | 4 | 8 | 46.0 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 4 | 6 | 4 | 8.5 | 33.9 | 27.0 | 27.0 | 4 | 21 | 56.5 | 42.5 | 4 | 21 | 23.0 | 23.0 | 4 | 10.5 | 4 | 6.5 | 48.0 | 88 | 100 | 4 | 8 | 32.0 | 31.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 9.5 | 4 | 7 | 33.9 | 24.0 | 24.0 | 4 | 20 | 56.5 | 46.0 | 4 | 20 | 21.0 | 21.0 | 4 | 11.5 | 4 | 6 | 48.0 | 88 | 100 | 4 | 8 | 31.0 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 7 | 33.9 | 24.0 | 24.0 | 4 | 21 | 56.5 | 35.0 | 4 | 21 | 20.0 | 20.0 | 4 | 11 | 5 | 6 | 48.0 | 88 | 100 | 4 | 7.5 | 29.0 | 30.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 12 | 4 | 6.5 | 51.8 | 24.0 | 24.0 | 4 | 20 | 34.0 | 31.0 | 4 | 20 | 19.0 | 20.0 | 4 | 10 | 5 | 6 | 46.0 | 88 | 100 | 4 | 7 | 28.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 9 | 8 | 4 | 11 | 4 | 7 | 43.8 | 24.0 | 24.0 | 4 | 18 | 30.0 | 30.0 | 4 | 18 | 19.0 | 20.0 | 4 | 9 | 4 | 6 | 41.6 | 88 | 100 | 4 | 6.5 | 28.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 12 FT | 8 | 8 | 9 | 8 | 4 | 9.5 | 4 | 6 | 41.3 | 24.0 | 24.0 | 4 | 16 | 29.0 | 30.0 | 4 | 16 | 19.0 | 19.0 | 4 | 8 | 5 | 6 | 40.4 | 88 | 100 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 14 FT | 8 | 9 | 9 | 8 | 4 | 9 | 5 | 7 | 39.9 | 24.0 | 28.0 | 4 | 15 | 28.0 | 29.0 | 4 | 15 | 19.0 | 19.0 | 4 | 8 | 5 | 6.5 | 41.4 | 89 | 101 | 4 | 6.5 | 27.0 | 29.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | |
| 16 FT | 8 | 9 | 9 | 8 | 4 | 8 | 5 | 6 | 39.1 | 24.0 | 28.0 | 4 | 13 | 28.0 | 29.0 | 4 | 13 | 19.0 | 19.0 | 4 | 7 | 5 | 6 | 40.8 | 89 | 101 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | |
| 18 FT | 8 | 9 | 9 | 8 | 4 | 7.5 | 5 | 6 | 36.5 | 24.0 | 28.0 | 4 | 13 | 26.0 | 28.0 | 4 | 13 | 19.0 | 19.0 | 4 | 7 | 5 | 6 | 38.1 | 89 | 101 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | |
| 20 FT | 8 | 9 | 9 | 8 | 4 | 7 | 6 | 7 | 39.1 | 24.0 | 32.0 | 5 | 18 | 26.0 | 28.0 | 5 | 18 | 19.0 | 19.0 | 4 | 6 | 6 | 7 | 40.9 | 89 | 101 | 5 | 7.5 | 27.0 | 29.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | |
| 22 FT | 8 | 10 | 9 | 8 | 4 | 6.5 | 6 | 7 | 38.8 | 24.0 | 28.0 | 5 | 17 | 27.0 | 28.0 | 5 | 17 | 19.0 | 20.0 | 4 | 6.5 | 5 | 6 | 39.0 | 90 | 102 | 5 | 8 | 27.0 | 29.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | |
| 24 FT | 9 | 11 | 9 | 8 | 4 | 6.5 | 5 | 6 | 37.0 | 25.0 | 29.0 | 5 | 18 | 26.0 | 28.0 | 5 | 18 | 19.0 | 19.0 | 4 | 6.5 | 5 | 6 | 39.8 | 91 | 103 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 26 FT | 9 | 11 | 9 | 8 | 4 | 6 | 5 | 6 | 36.9 | 25.0 | 29.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 19.0 | 19.0 | 4 | 6 | 5 | 6 | 39.6 | 91 | 103 | 5 | 8.5 | 27.0 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | |
| 28 FT | 10 | 12 | 9 | 8 | 4 | 6 | 5 | 6 | 37.9 | 30.0 | 30.0 | 5 | 17 | 26.0 | 28.0 | 5 | 17 | 19.0 | 19.0 | 4 | 6 | 5 | 6 | 40.3 | 92 | 104 | 4 | 6 | 27.0 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | |
| 30 FT | 10 | 12 | 9 | 8 | 4 | 6 | 5 | 6 | 37.8 | 30.0 | 30.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 19.0 | 19.0 | 4 | 6 | 6 | 7.5 | 43.1 | 92 | 104 | 5 | 8.5 | 27.0 | 29.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | |
| 32 FT | 11 | 12 | 10 | 8 | 4 | 6 | 5 | 6.5 | 38.4 | 31.0 | 31.0 | 5 | 17 | 26.0 | 28.0 | 5 | 17 | 18.0 | 19.0 | 5 | 9 | 5 | 6.5 | 39.6 | 92 | 104 | 5 | 8 | 27.0 | 29.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 34 FT | 11 | 13 | 10 | 8 | 5 | 9 | 5 | 6.5 | 38.3 | 31.0 | 31.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 19.0 | 19.0 | 5 | 9 | 5 | 6.5 | 40.4 | 93 | 105 | 5 | 8.5 | 28.0 | 30.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 36 FT | 12 | 13 | 10 | 8 | 5 | 9 | 5 | 6.5 | 39.1 | 32.0 | 32.0 | 5 | 17 | 26.0 | 28.0 | 5 | 17 | 18.0 | 19.0 | 5 | 8.5 | 5 | 6.5 | 40.3 | 93 | 105 | 5 | 8 | 27.0 | 30.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 38 FT | 12 | 14 | 10 | 8 | 5 | 8.5 | 5 | 6 | 39.0 | 32.0 | 32.0 | 5 | 17 | 26.0 | 28.0 | 5 | 17 | 18.0 | 19.0 | 5 | 9 | 5 | 6.5 | 40.9 | 94 | 106 | 5 | 8.5 | 28.0 | 30.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 40 FT | 12 | 14 | 11 | 8 | 5 | 8 | 5 | 7 | 38.9 | 32.0 | 32.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 18.0 | 19.0 | 5 | 8.5 | 5 | 7 | 40.8 | 94 | 106 | 5 | 8 | 28.0 | 30.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 42 FT | 13 | 14 | 11 | 8 | 5 | 8.5 | 5 | 7 | 39.6 | 33.0 | 33.0 | 5 | 17 | 26.0 | 28.0 | 5 | 17 | 18.0 | 19.0 | 5 | 8 | 5 | 7 | 40.5 | 94 | 106 | 5 | 7.5 | 28.0 | 30.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 44 FT | 13 | 15 | 11 | 8 | 5 | 8 | 5 | 6.5 | 39.5 | 33.0 | 33.0 | 5 | 16 | 26.0 | 28.0 | 5 | 16 | 18.0 | 19.0 | 5 | 8 | 5 | 7 | 41.3 | 95 | 107 | 5 | 8 | 28.0 | 30.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 46 FT | 13 | 15 | 12 | 8 | 5 | 7.5 | 5 | 6.5 | 39.5 | 33.0 | 33.0 | 5 | 15 | 26.0 | 28.0 | 5 | 15 | 18.0 | 19.0 | 5 | 8 | 5 | 6.5 | 41.0 | 95 | 107 | 5 | 7.5 | 28.0 | 30.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | |
| 48 FT | 14 | 15 | 12 | 8 | 5 | 8 | 5 | 6.5 | 40.3 | 34.0 | 34.0 | 5 | 17 | 26.0 | 27.0 | 5 | 17 | 18.0 | 19.0 | 5 | 7.5 | 5 | 6.5 | 40.9 | 95 | 107 | 5 | 7 | 28.0 | 30.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | |
| 50 FT | 14 | 16 | 12 | 8 | 5 | 7.5 | 5 | 6.5 | 40.1 | 34.0 | 34.0 | 5 | 16 | 26.0 | 27.0 | 5 | 16 | 18.0 | 19.0 | 5 | 8 | 5 | 6.5 | 41.6 | 96 | 108 | 5 | 7.5 | 28.0 | 30.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 5 FEET
HEIGHT (HT): 7 THRU 8 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

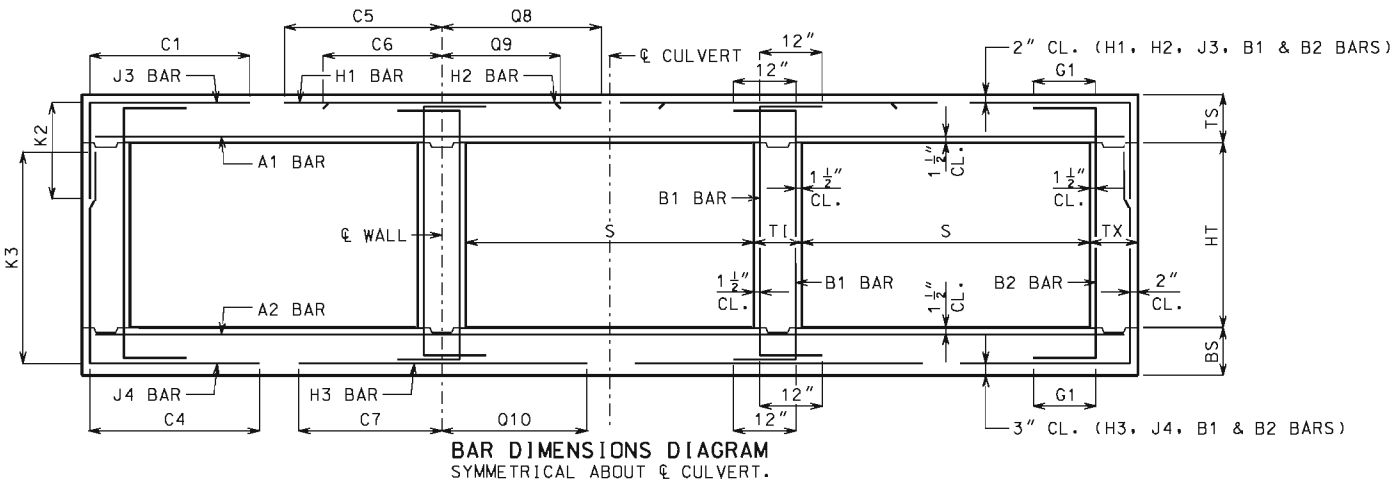
SHEET NO.
5 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 3 FT OR 4 FT OR 5 FT | | | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|------|------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|-------|---------|------|------|------------------------------------|---------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=3' | HT=4' | HT=5' | | | | | | | | | | | | | | HT=3' | HT=4' | HT=5' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 5 | 8 | 4 | 9.5 | 37.5 | 27.0 | 27.0 | 27.0 | 4 | 17 | 64.5 | 48.5 | 4 | 17 | 24.0 | 23.0 | 4 | 10 | 4 | 10 | 38.1 | 40 | 52 | 64 | 4 | 7.5 | 33.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 5 | 8 | 4 | 9.5 | 37.5 | 27.0 | 27.0 | 27.0 | 4 | 17 | 64.5 | 48.5 | 4 | 17 | 23.0 | 22.0 | 4 | 9.5 | 4 | 9 | 35.1 | 40 | 52 | 64 | 4 | 7 | 33.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 7.5 | 4 | 8.5 | 35.8 | 24.0 | 24.0 | 24.0 | 4 | 14 | 43.0 | 52.0 | 4 | 14 | 21.0 | 21.0 | 4 | 9 | 4 | 9.5 | 32.1 | 40 | 52 | 64 | 4 | 6.5 | 32.0 | 33.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 9 | 4 | 9.5 | 32.6 | 24.0 | 24.0 | 24.0 | 4 | 14 | 35.0 | 38.0 | 4 | 14 | 21.0 | 20.0 | 4 | 8.5 | 4 | 8.5 | 30.0 | 40 | 52 | 64 | 4 | 6 | 31.0 | 32.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 9 | 4 | 9 | 30.4 | 24.0 | 24.0 | 24.0 | 4 | 13 | 33.0 | 35.0 | 4 | 13 | 20.0 | 20.0 | 4 | 8 | 4 | 8 | 29.0 | 40 | 52 | 64 | 5 | 7.5 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 8 | 4 | 8 | 29.4 | 24.0 | 24.0 | 24.0 | 4 | 12 | 32.0 | 34.0 | 4 | 12 | 20.0 | 20.0 | 4 | 7 | 4 | 7 | 28.4 | 40 | 52 | 64 | 5 | 6.5 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 12 FT | 8 | 9 | 8 | 8 | 4 | 7 | 4 | 7 | 28.8 | 24.0 | 24.0 | 24.0 | 5 | 17 | 31.0 | 33.0 | 5 | 17 | 20.0 | 20.0 | 4 | 6.5 | 4 | 9 | 27.4 | 41 | 53 | 65 | 5 | 7 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 14 FT | 8 | 9 | 8 | 8 | 4 | 6.5 | 4 | 6.5 | 28.3 | 24.0 | 24.0 | 24.0 | 5 | 16 | 31.0 | 32.0 | 5 | 16 | 21.0 | 21.0 | 5 | 9 | 4 | 8 | 26.9 | 41 | 53 | 65 | 5 | 6.5 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 16 FT | 9 | 10 | 8 | 8 | 4 | 6 | 4 | 7.5 | 27.6 | 25.0 | 25.0 | 25.0 | 5 | 16 | 30.0 | 33.0 | 5 | 16 | 20.0 | 20.0 | 5 | 9 | 4 | 9.5 | 26.5 | 42 | 54 | 66 | 5 | 7 | 29.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 18 FT | 9 | 10 | 8 | 8 | 5 | 9 | 4 | 6.5 | 27.4 | 25.0 | 25.0 | 25.0 | 5 | 16 | 30.0 | 32.0 | 5 | 16 | 21.0 | 21.0 | 5 | 8 | 4 | 8.5 | 26.3 | 42 | 54 | 66 | 5 | 6.5 | 29.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 20 FT | 10 | 11 | 8 | 8 | 5 | 9 | 4 | 7 | 27.0 | 26.0 | 26.0 | 26.0 | 5 | 15 | 30.0 | 33.0 | 5 | 15 | 20.0 | 20.0 | 5 | 8 | 4 | 8.5 | 26.0 | 43 | 55 | 67 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 22 FT | 10 | 11 | 8 | 8 | 5 | 8.5 | 4 | 6.5 | 26.0 | 26.0 | 26.0 | 26.0 | 5 | 15 | 29.0 | 32.0 | 5 | 15 | 20.0 | 20.0 | 5 | 7.5 | 4 | 8.5 | 25.0 | 43 | 55 | 67 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 24 FT | 11 | 12 | 8 | 8 | 5 | 8.5 | 4 | 6.5 | 25.8 | 27.0 | 27.0 | 27.0 | 5 | 15 | 29.0 | 32.0 | 5 | 15 | 20.0 | 20.0 | 5 | 8 | 4 | 8.5 | 24.9 | 44 | 56 | 68 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 26 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 4 | 6 | 25.6 | 27.0 | 27.0 | 27.0 | 5 | 14 | 29.0 | 32.0 | 5 | 14 | 20.0 | 20.0 | 5 | 6.5 | 4 | 8 | 24.9 | 44 | 56 | 68 | 5 | 6.5 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 28 FT | 12 | 13 | 8 | 8 | 5 | 7.5 | 4 | 6.5 | 25.5 | 28.0 | 28.0 | 28.0 | 5 | 14 | 29.0 | 32.0 | 5 | 14 | 19.0 | 20.0 | 5 | 7.5 | 4 | 8 | 24.9 | 45 | 57 | 69 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 30 FT | 12 | 14 | 8 | 8 | 5 | 7 | 4 | 6 | 25.6 | 28.0 | 28.0 | 28.0 | 5 | 13 | 29.0 | 32.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7.5 | 4 | 7.5 | 24.8 | 46 | 58 | 70 | 5 | 7 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 32 FT | 13 | 14 | 8 | 8 | 5 | 7 | 4 | 6 | 25.4 | 29.0 | 29.0 | 29.0 | 5 | 14 | 28.0 | 33.0 | 5 | 14 | 19.0 | 20.0 | 5 | 7 | 4 | 7.5 | 24.9 | 46 | 58 | 70 | 5 | 6.5 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 34 FT | 13 | 15 | 8 | 8 | 5 | 7 | 5 | 8.5 | 25.6 | 29.0 | 29.0 | 29.0 | 5 | 13 | 28.0 | 32.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 4 | 7 | 24.8 | 47 | 59 | 71 | 5 | 7 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 36 FT | 14 | 15 | 8 | 8 | 5 | 7 | 4 | 6 | 25.4 | 30.0 | 30.0 | 30.0 | 5 | 13 | 28.0 | 33.0 | 5 | 13 | 19.0 | 20.0 | 5 | 6.5 | 4 | 7 | 25.0 | 47 | 59 | 71 | 5 | 6.5 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 38 FT | 14 | 16 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 25.5 | 30.0 | 30.0 | 30.0 | 5 | 13 | 28.0 | 32.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 4 | 6.5 | 24.9 | 48 | 60 | 72 | 5 | 6.5 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 40 FT | 15 | 16 | 8 | 8 | 5 | 6.5 | 5 | 8 | 30.4 | 31.0 | 31.0 | 31.0 | 5 | 13 | 33.0 | 38.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6.5 | 4 | 6.5 | 25.1 | 48 | 60 | 72 | 5 | 6.5 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 42 FT | 15 | 17 | 8 | 8 | 5 | 6.5 | 5 | 8 | 30.6 | 31.0 | 31.0 | 31.0 | 5 | 12 | 33.0 | 37.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6.5 | 4 | 6 | 25.1 | 49 | 61 | 73 | 5 | 6.5 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 44 FT | 16 | 17 | 8 | 8 | 5 | 6.5 | 5 | 7 | 30.5 | 32.0 | 32.0 | 32.0 | 5 | 13 | 33.0 | 37.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6.5 | 4 | 6 | 25.3 | 49 | 61 | 73 | 5 | 6 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 46 FT | 16 | 17 | 8 | 8 | 5 | 6 | 5 | 7 | 30.5 | 32.0 | 32.0 | 32.0 | 5 | 12 | 33.0 | 37.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6 | 4 | 6 | 25.3 | 49 | 61 | 73 | 5 | 6 | 28.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 48 FT | 17 | 18 | 8 | 8 | 5 | 6 | 5 | 6.5 | 30.6 | 37.0 | 37.0 | 37.0 | 5 | 13 | 33.0 | 37.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 5 | 6.5 | 25.5 | 50 | 62 | 74 | 5 | 6 | 28.0 | 33.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | |
| 50 FT | 17 | 18 | 8 | 8 | 5 | 6 | 5 | 6.5 | 30.6 | 37.0 | 37.0 | 37.0 | 5 | 12 | 33.0 | 37.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6 | 5 | 6.5 | 25.4 | 50 | 62 | 74 | 5 | 6 | 28.0 | 33.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | |

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------------------|---------|------|------|------|---------|-------|------|------|---------|----------------------------|---------|------|------|------|----|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | |
| | | | | | | | | | | HT=6' | HT=7' | | | | | | | | | | | | | | HT=6' | HT=7' | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 5 | 8 | 4 | 9.5 | 37.5 | 27.0 | 27.0 | 4 | 17 | 64.5 | 48.5 | 4 | 17 | 24.0 | 24.0 | 4 | 9.5 | 4 | 7.5 | 52.8 | 76 | 88 | 4 | 7 | 34.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 5 | 8 | 4 | 9.5 | 37.5 | 27.0 | 27.0 | 4 | 17 | 64.5 | 48.5 | 4 | 17 | 23.0 | 23.0 | 4 | 8.5 | 4 | 7 | 47.3 | 76 | 88 | 4 | 6.5 | 33.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 7 | 4 | 7 | 37.5 | 24.0 | 24.0 | 4 | 14 | 64.5 | 52.0 | 4 | 14 | 21.0 | 22.0 | 4 | 8.5 | 4 | 7 | 43.0 | 76 | 88 | 4 | 6.5 | 32.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 8.5 | 4 | 7.5 | 41.9 | 24.0 | 24.0 | 4 | 14 | 37.0 | 39.0 | 4 | 14 | 21.0 | 21.0 | 4 | 8 | 4 | 6.5 | 39.1 | 76 | 88 | 4 | 6 | 31.0 | 33.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 8.5 | 4 | 7 | 37.6 | 24.0 | 24.0 | 4 | 13 | 34.0 | 35.0 | 4 | 13 | 20.0 | 20.0 | 4 | 7.5 | 4 | 6 | 36.9 | 76 | 88 | 5 | 7 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 10 FT | 8 | 8 | 8 | 8 | 4 | 8 | 4 | 6 | 36.0 | 24.0 | 24.0 | 4 | 12 | 32.0 | 34.0 | 4 | 12 | 20.0 | 20.0 | 4 | 6.5 | 5 | 6 | 35.4 | 76 | 88 | 5 | 6.5 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 12 FT | 8 | 9 | 8 | 8 | 4 | 7 | 5 | 6.5 | 34.8 | 24.0 | 24.0 | 5 | 17 | 31.0 | 33.0 | 5 | 17 | 20.0 | 20.0 | 4 | 6.5 | 4 | 6 | 35.0 | 77 | 89 | 5 | 7 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 14 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 6 | 33.9 | 24.0 | 28.0 | 5 | 16 | 31.0 | 33.0 | 5 | 16 | 21.0 | 21.0 | 5 | 8.5 | 5 | 6.5 | 34.1 | 77 | 89 | 5 | 6.5 | 30.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 16 FT | 9 | 10 | 8 | 8 | 4 | 6 | 5 | 6.5 | 33.8 | 25.0 | 25.0 | 5 | 16 | 30.0 | 33.0 | 5 | 16 | 20.0 | 20.0 | 5 | 9 | 4 | 6 | 34.0 | 78 | 90 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 18 FT | 9 | 10 | 8 | 8 | 5 | 9 | 5 | 6.5 | 33.4 | 25.0 | 29.0 | 5 | 16 | 30.0 | 32.0 | 5 | 16 | 21.0 | 21.0 | 5 | 8 | 5 | 6.5 | 33.6 | 78 | 90 | 5 | 6.5 | 29.0 | 32.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 20 FT | 9 | 11 | 8 | 8 | 5 | 8 | 5 | 6 | 33.1 | 25.0 | 29.0 | 5 | 16 | 30.0 | 32.0 | 5 | 16 | 21.0 | 22.0 | 5 | 8 | 5 | 7 | 33.8 | 79 | 91 | 5 | 7.5 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 22 FT | 10 | 11 | 8 | 8 | 5 | 8.5 | 5 | 7 | 31.6 | 26.0 | 30.0 | 5 | 15 | 29.0 | 32.0 | 5 | 15 | 20.0 | 20.0 | 5 | 7.5 | 5 | 7 | 31.9 | 79 | 91 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 24 FT | 10 | 12 | 8 | 8 | 5 | 7.5 | 5 | 6.5 | 31.6 | 26.0 | 30.0 | 5 | 15 | 29.0 | 32.0 | 5 | 15 | 20.0 | 21.0 | 5 | 8 | 5 | 7.5 | 32.0 | 80 | 92 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | |
| 26 FT | 11 | 13 | 8 | 8 | 5 | 8 | 5 | 6.5 | 31.9 | 27.0 | 31.0 | 5 | 14 | 29.0 | 32.0 | 5 | 14 | 20.0 | 20.0 | 5 | 8 | 5 | 7.5 | 32.3 | 81 | 93 | 5 | 7.5 | 29.0 | 33.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | |
| 28 FT | 12 | 13 | 8 | 8 | 5 | 8 | 5 | 7 | 31.9 | 28.0 | 32.0 | 5 | 14 | 29.0 | 32.0 | 5 | 14 | 19.0 | 20.0 | 5 | 7.5 | 5 | 7 | 32.3 | 81 | 93 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | |
| 30 FT | 12 | 14 | 8 | 8 | 5 | 7.5 | 5 | 6.5 | 32.0 | 28.0 | 32.0 | 5 | 13 | 29.0 | 32.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7.5 | 5 | 7.5 | 32.4 | 82 | 94 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | |
| 32 FT | 13 | 14 | 8 | 8 | 5 | 7.5 | 5 | 6.5 | 32.0 | 33.0 | 33.0 | 5 | 14 | 28.0 | 32.0 | 5 | 14 | 19.0 | 20.0 | 5 | 7 | 5 | 7 | 32.5 | 82 | 94 | 5 | 6.5 | 29.0 | 33.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | |
| 34 FT | 13 | 15 | 8 | 8 | 5 | 7 | 5 | 6.5 | 32.1 | 33.0 | 33.0 | 5 | 13 | 28.0 | 32.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 5 | 7 | 32.6 | 83 | 95 | 5 | 7 | 29.0 | 33.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | |
| 36 FT | 14 | 15 | 8 | 8 | 5 | 7 | 5 | 6 | 32.3 | 34.0 | 34.0 | 5 | 14 | 28.0 | 32.0 | 5 | 14 | 19.0 | 20.0 | 5 | 7 | 5 | 6.5 | 32.8 | 83 | 95 | 5 | 6.5 | 29.0 | 33.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | |
| 38 FT | 14 | 16 | 9 | 8 | 5 | 6.5 | 5 | 7 | 32.9 | 30.0 | 34.0 | 5 | 13 | 28.0 | 32.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 5 | 8 | 33.1 | 84 | 96 | 5 | 6.5 | 29.0 | 33.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | |
| 40 FT | 14 | 16 | 10 | 8 | 5 | 6 | 5 | 7.5 | 33.3 | 30.0 | 34.0 | 5 | 12 | 28.0 | 32.0 | 5 | 12 | 19.0 | 20.0 | 5 | 6.5 | 5 | 7.5 | 33.4 | 84 | 96 | 5 | 6.5 | 29.0 | 33.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | |
| 42 FT | 15 | 17 | 10 | 8 | 5 | 6.5 | 5 | 7.5 | 38.5 | 31.0 | 35.0 | 5 | 13 | 33.0 | 37.0 | 5 | 13 | 24.0 | 25.0 | 5 | 7 | 5 | 7.5 | 33.6 | 85 | 97 | 5 | 6.5 | 29.0 | 33.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | |
| 44 FT | 15 | 17 | 10 | 8 | 5 | 6.5 | 5 | 7.5 | 38.5 | 31.0 | 35.0 | 5 | 12 | 33.0 | 37.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6.5 | 5 | 7.5 | 33.6 | 85 | 97 | 5 | 6 | 29.0 | 33.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | |
| 46 FT | 16 | 17 | 10 | 8 | 5 | 6.5 | 5 | 7 | 38.6 | 32.0 | 36.0 | 5 | 13 | 33.0 | 36.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 5 | 7.5 | 33.8 | 85 | 97 | 5 | 6 | 29.0 | 33.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | |
| 48 FT | 16 | 18 | 11 | 8 | 5 | 6 | 5 | 7 | 39.3 | 32.0 | 36.0 | 5 | 12 | 33.0 | 36.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6.5 | 5 | 7.5 | 34.1 | 86 | 98 | 5 | 6 | 29.0 | 34.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | |
| 50 FT | 17 | 18 | 11 | 8 | 5 | 6 | 5 | 7 | 39.4 | 33.0 | 37.0 | 5 | 13 | 33.0 | 36.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 5 | 7.5 | 34.3 | 86 | 98 | 5 | 6 | 29.0 | 33.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | |

| SPAN (S) = 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|---------|------|----------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | | | | | | | | | | | | | | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 11 | 8 | 8 | 8 | 5 | 7.5 | 4 | 7 | 37.5 | 27.0 | 27.0 | 4 | 17 | 64.5 | 48.5 | 4 | 17 | 24.0 | 25.0 | 4 | 8.5 | 5 | 6.5 | 54.0 | 100 | 112 | 4 | 7 | 52.0 | 35.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 11 | 8 | 8 | 8 | 5 | 7.5 | 4 | 6.5 | 37.5 | 27.0 | 27.0 | 4 | 17 | 64.5 | 48.5 | 4 | 17 | 23.0 | 24.0 | 4 | 8 | 5 | 6 | 54.0 | 100 | 112 | 4 | 6.5 | 35.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 9 | 8 | 4 | 7 | 4 | 6 | 38.1 | 24.0 | 24.0 | 4 | 14 | 64.5 | 52.0 | 4 | 14 | 22.0 | 22.0 | 4 | 8 | 5 | 6.5 | 54.8 | 100 | 112 | 4 | 6 | 33.0 | 34.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 9 | 8 | 4 | 8.5 | 4 | 6 | 38.1 | 24.0 | 24.0 | 4 | 14 | 64.5 | 40.0 | 4 | 14 | 21.0 | 21.0 | 4 | 8 | 5 | 6 | 50.8 | 100 | 112 | 4 | 6 | 32.0 | 33.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 9 | 8 | 4 | 8.5 | 4 | 6 | 50.1 | 24.0 | 24.0 | 4 | 14 | 35.0 | 35.0 | 4 | 14 | 20.0 | 20.0 | 4 | 8.5 | 5 | 6.5 | 50.8 | 101 | 113 | 4 | 6.5 | 31.0 | 33.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 9 | 9 | 8 | 4 | 8 | 5 | 6.5 | 45.8 | 24.0 | 28.0 | 4 | 12 | 33.0 | 33.0 | 4 | 12 | 20.0 | 20.0 | 4 | 7.5 | 5 | 6 | 47.5 | 101 | 113 | 4 | 6 | 31.0 | 33.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 9 | 10 | 8 | 4 | 7 | 5 | 6.5 | 43.0 | 24.0 | 28.0 | 5 | 17 | 32.0 | 33.0 | 5 | 17 | 20.0 | 20.0 | 4 | 6.5 | 5 | 6.5 | 44.8 | 101 | 113 | 5 | 7 | 30.0 | 32.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | |
| 14 FT | 8 | 9 | 10 | 8 | 4 | 6.5 | 5 | 6 | 41.6 | 28.0 | 28.0 | 5 | 17 | 31.0 | 32.0 | 5 | 17 | 21.0 | 21.0 | 4 | 6 | 5 | 6 | 43.5 | 101 | 113 | 5 | 6.5 | 30.0 | 32.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |
| 16 FT | 8 | 10 | 10 | 8 | 4 | 6 | 6 | 7 | 43.3 | 28.0 | 28.0 | 5 | 16 | 30.0 | 32.0 | 5 | 16 | 22.0 | 22.0 | 5 | 9 | 5 | 6 | 44.4 | 102 | 114 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 18 FT | 9 | 10 | 10 | 8 | 4 | 6 | 5 | 6 | 41.8 | 29.0 | 29.0 | 5 | 16 | 30.0 | 32.0 | 5 | 16 | 20.0 | 21.0 | 5 | 8.5 | 6 | 7.5 | 46.4 | 102 | 114 | 5 | 7 | 30.0 | 32.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 20 FT | 9 | 11 | 10 | 8 | 5 | 8.5 | 5 | 6 | 41.0 | 29.0 | 29.0 | 5 | 16 | 30.0 | 32.0 | 5 | 16 | 21.0 | 22.0 | 5 | 8.5 | 5 | 6 | 44.4 | 103 | 115 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 22 FT | 10 | 11 | 10 | 8 | 5 | 9 | 5 | 6.5 | 39.9 | 30.0 | 30.0 | 5 | 15 | 29.0 | 32.0 | 5 | 15 | 20.0 | 20.0 | 5 | 8 | 5 | 6 | 41.4 | 103 | 115 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 24 FT | 10 | 12 | 10 | 8 | 5 | 8 | 5 | 6.5 | 39.5 | 30.0 | 30.0 | 5 | 15 | 29.0 | 32.0 | 5 | 15 | 20.0 | 21.0 | 5 | 8 | 5 | 6 | 42.3 | 104 | 116 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 26 FT | 11 | 12 | 10 | 8 | 5 | 8 | 5 | 6 | 40.5 | 31.0 | 31.0 | 5 | 14 | 29.0 | 32.0 | 5 | 14 | 19.0 | 20.0 | 5 | 7 | 5 | 6 | 41.9 | 104 | 116 | 5 | 6.5 | 30.0 | 33.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 28 FT | 11 | 13 | 10 | 8 | 5 | 7.5 | 5 | 6 | 40.3 | 31.0 | 31.0 | 5 | 14 | 29.0 | 32.0 | 5 | 14 | 20.0 | 20.0 | 5 | 7.5 | 5 | 6 | 42.8 | 105 | 117 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 30 FT | 12 | 14 | 10 | 8 | 5 | 8 | 5 | 6 | 41.0 | 32.0 | 32.0 | 5 | 14 | 29.0 | 31.0 | 5 | 14 | 19.0 | 20.0 | 5 | 8 | 5 | 6 | 43.3 | 106 | 118 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 32 FT | 12 | 14 | 11 | 8 | 5 | 7.5 | 5 | 6.5 | 40.8 | 32.0 | 32.0 | 5 | 13 | 29.0 | 31.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7.5 | 5 | 7 | 42.9 | 106 | 118 | 5 | 6.5 | 30.0 | 33.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 34 FT | 13 | 15 | 11 | 8 | 5 | 7.5 | 5 | 6.5 | 41.5 | 33.0 | 33.0 | 5 | 13 | 28.0 | 31.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7.5 | 5 | 7 | 43.5 | 107 | 119 | 5 | 7 | 30.0 | 33.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 36 FT | 13 | 15 | 11 | 8 | 5 | 7 | 5 | 6 | 41.4 | 33.0 | 33.0 | 5 | 13 | 28.0 | 31.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 5 | 6.5 | 43.4 | 107 | 119 | 5 | 6.5 | 30.0 | 33.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 38 FT | 14 | 16 | 12 | 8 | 5 | 7 | 5 | 6.5 | 42.1 | 34.0 | 34.0 | 5 | 13 | 28.0 | 31.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 5 | 6.5 | 43.8 | 108 | 120 | 5 | 6.5 | 30.0 | 33.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 40 FT | 14 | 16 | 12 | 8 | 5 | 7 | 5 | 6 | 42.0 | 34.0 | 34.0 | 5 | 13 | 28.0 | 31.0 | 5 | 13 | 19.0 | 20.0 | 5 | 7 | 5 | 6.5 | 43.6 | 108 | 120 | 5 | 6.5 | 30.0 | 33.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 42 FT | 15 | 17 | 12 | 8 | 5 | 7 | 5 | 6 | 47.6 | 35.0 | 35.0 | 5 | 13 | 33.0 | 36.0 | 5 | 13 | 24.0 | 25.0 | 5 | 7 | 5 | 6.5 | 44.3 | 109 | 121 | 5 | 6.5 | 30.0 | 33.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 44 FT | 15 | 17 | 13 | 8 | 5 | 6.5 | 5 | 6 | 47.6 | 35.0 | 35.0 | 5 | 13 | 33.0 | 36.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6.5 | 5 | 6 | 44.0 | 109 | 121 | 5 | 6 | 30.0 | 33.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 46 FT | 15 | 17 | 13 | 8 | 5 | 6 | 5 | 6 | 47.6 | 35.0 | 35.0 | 5 | 12 | 33.0 | 36.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6 | 5 | 6 | 43.9 | 109 | 121 | 5 | 6 | 30.0 | 33.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 48 FT | 16 | 18 | 13 | 8 | 5 | 6.5 | 5 | 6 | 48.3 | 36.0 | 36.0 | 5 | 13 | 33.0 | 35.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6.5 | 5 | 6 | 44.5 | 110 | 122 | 5 | 6 | 30.0 | 33.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 50 FT | 16 | 18 | 14 | 8 | 5 | 6 | 5 | 6 | 48.3 | 36.0 | 36.0 | 5 | 12 | 33.0 | 35.0 | 5 | 12 | 24.0 | 25.0 | 5 | 6 | 5 | 6 | 44.3 | 110 | 122 | 6 | 8.5 | 32.0 | 37.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

CONCRETE
TRIPLE BOX CULVERT

MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS

SPAN (S): 6 FEET
HEIGHT (HT): 8 THRU 9 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
7 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|----|-------|-------|---------|------|---------|------|------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | |
| | | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 8 | 8 | 8 | 5 | 7.5 | 4 | 8.5 | 41.1 | 28.0 | 28.0 | 28.0 | 4 | 16 | 72.5 | 54.5 | 4 | 16 | 25.0 | 25.0 | 4 | 8.5 | 4 | 7.5 | 42.5 | 52 | 64 | 76 | 4 | 6 | 36.0 | 37.0 | 5 | 12 | 5 | 12 | 2 | | | | | | | | | | |
| 2 FT | 12 | 8 | 8 | 8 | 5 | 7.5 | 4 | 8.5 | 41.1 | 28.0 | 28.0 | 28.0 | 4 | 15 | 72.5 | 54.5 | 4 | 15 | 24.0 | 24.0 | 4 | 7.5 | 4 | 7 | 39.0 | 52 | 64 | 76 | 5 | 7.5 | 35.0 | 37.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 6 | 4 | 6.5 | 39.5 | 24.0 | 24.0 | 24.0 | 5 | 17 | 47.0 | 58.0 | 5 | 17 | 23.0 | 23.0 | 4 | 7 | 4 | 7 | 36.0 | 52 | 64 | 76 | 5 | 7 | 35.0 | 37.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 6.5 | 4 | 7 | 36.0 | 24.0 | 24.0 | 24.0 | 5 | 17 | 38.0 | 42.0 | 5 | 17 | 22.0 | 22.0 | 4 | 6.5 | 4 | 6.5 | 33.4 | 52 | 64 | 76 | 5 | 6.5 | 34.0 | 36.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | |
| 8 FT | 8 | 8 | 8 | 8 | 4 | 6.5 | 4 | 6.5 | 33.5 | 24.0 | 24.0 | 24.0 | 5 | 17 | 36.0 | 38.0 | 5 | 17 | 23.0 | 22.0 | 5 | 9 | 4 | 6 | 32.0 | 52 | 64 | 76 | 5 | 6 | 33.0 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 10 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 7 | 32.3 | 24.0 | 24.0 | 24.0 | 5 | 16 | 35.0 | 37.0 | 5 | 16 | 23.0 | 23.0 | 5 | 9 | 4 | 7 | 30.9 | 53 | 65 | 77 | 5 | 6.5 | 33.0 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 12 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 6 | 31.4 | 24.0 | 24.0 | 24.0 | 5 | 14 | 34.0 | 36.0 | 5 | 14 | 23.0 | 23.0 | 5 | 7.5 | 4 | 6 | 30.1 | 53 | 65 | 77 | 5 | 6 | 32.0 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 14 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 4 | 6 | 30.5 | 25.0 | 25.0 | 25.0 | 5 | 15 | 33.0 | 36.0 | 5 | 15 | 23.0 | 23.0 | 5 | 7.5 | 4 | 7 | 29.5 | 54 | 66 | 78 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 16 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 8 | 29.9 | 26.0 | 26.0 | 26.0 | 5 | 15 | 33.0 | 36.0 | 5 | 15 | 22.0 | 22.0 | 5 | 7.5 | 4 | 7 | 29.0 | 55 | 67 | 79 | 5 | 6.5 | 32.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 18 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 7.5 | 29.5 | 26.0 | 26.0 | 26.0 | 5 | 15 | 33.0 | 36.0 | 5 | 15 | 23.0 | 24.0 | 5 | 6 | 4 | 6.5 | 28.6 | 55 | 67 | 79 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 20 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 8.5 | 29.1 | 27.0 | 27.0 | 27.0 | 5 | 14 | 32.0 | 36.0 | 5 | 14 | 22.0 | 23.0 | 5 | 6.5 | 4 | 6.5 | 28.4 | 56 | 68 | 80 | 5 | 6 | 31.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 22 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 8.5 | 28.9 | 28.0 | 28.0 | 28.0 | 5 | 13 | 32.0 | 36.0 | 5 | 13 | 21.0 | 22.0 | 5 | 6.5 | 4 | 6 | 28.3 | 57 | 69 | 81 | 5 | 6 | 31.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 24 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 8.5 | 27.6 | 28.0 | 28.0 | 28.0 | 5 | 13 | 31.0 | 36.0 | 5 | 13 | 21.0 | 22.0 | 5 | 6 | 4 | 6 | 27.1 | 57 | 69 | 81 | 6 | 8 | 34.0 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 26 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 27.5 | 29.0 | 29.0 | 29.0 | 5 | 12 | 31.0 | 36.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6.5 | 4 | 6 | 27.1 | 58 | 70 | 82 | 5 | 6 | 31.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 28 FT | 13 | 15 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 27.6 | 29.0 | 29.0 | 29.0 | 5 | 12 | 31.0 | 36.0 | 5 | 12 | 21.0 | 22.0 | 5 | 6.5 | 4 | 6.5 | 27.0 | 59 | 71 | 83 | 5 | 6 | 31.0 | 37.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 30 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8.5 | 27.5 | 30.0 | 30.0 | 34.0 | 5 | 12 | 31.0 | 36.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6 | 5 | 8.5 | 27.1 | 59 | 71 | 83 | 6 | 8 | 34.0 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 32 FT | 15 | 16 | 8 | 8 | 5 | 6 | 5 | 8 | 32.5 | 31.0 | 31.0 | 35.0 | 6 | 17 | 39.0 | 45.0 | 6 | 17 | 29.0 | 30.0 | 5 | 6 | 5 | 8 | 27.3 | 60 | 72 | 84 | 6 | 8 | 34.0 | 40.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | |
| 34 FT | 15 | 17 | 8 | 8 | 5 | 6 | 5 | 8 | 32.6 | 31.0 | 31.0 | 31.0 | 6 | 16 | 39.0 | 45.0 | 6 | 16 | 29.0 | 30.0 | 5 | 6 | 4 | 6 | 27.3 | 61 | 73 | 85 | 6 | 8.5 | 34.0 | 40.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | |
| 36 FT | 16 | 17 | 8 | 8 | 5 | 6 | 5 | 7 | 32.5 | 32.0 | 32.0 | 36.0 | 6 | 16 | 39.0 | 45.0 | 6 | 16 | 29.0 | 30.0 | 6 | 8.5 | 5 | 7 | 27.4 | 61 | 73 | 85 | 6 | 8 | 34.0 | 40.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | |
| 38 FT | 16 | 18 | 8 | 8 | 6 | 8 | 5 | 7 | 32.6 | 32.0 | 36.0 | 36.0 | 6 | 15 | 39.0 | 45.0 | 6 | 15 | 29.0 | 30.0 | 5 | 6 | 5 | 6.5 | 27.4 | 62 | 74 | 86 | 6 | 8 | 34.0 | 40.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | |
| 40 FT | 17 | 18 | 8 | 8 | 6 | 8 | 5 | 6.5 | 32.6 | 37.0 | 37.0 | 37.0 | 6 | 16 | 39.0 | 45.0 | 6 | 16 | 29.0 | 30.0 | 6 | 8 | 5 | 6.5 | 27.6 | 62 | 74 | 86 | 6 | 7.5 | 34.0 | 40.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 42 FT | 17 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 32.8 | 37.0 | 37.0 | 37.0 | 6 | 15 | 39.0 | 45.0 | 6 | 15 | 29.0 | 30.0 | 6 | 8 | 5 | 6.5 | 27.6 | 63 | 75 | 87 | 6 | 8 | 34.0 | 40.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 44 FT | 18 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 32.6 | 38.0 | 38.0 | 38.0 | 6 | 15 | 39.0 | 45.0 | 6 | 15 | 29.0 | 30.0 | 6 | 7.5 | 5 | 6.5 | 27.8 | 63 | 75 | 87 | 6 | 7.5 | 34.0 | 40.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 46 FT | 18 | 20 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 32.8 | 38.0 | 38.0 | 38.0 | 6 | 15 | 39.0 | 44.0 | 6 | 15 | 29.0 | 30.0 | 6 | 8 | 5 | 6 | 27.8 | 64 | 76 | 88 | 6 | 7.5 | 34.0 | 40.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 48 FT | 19 | 20 | 8 | 8 | 6 | 7.5 | 5 | 6 | 32.8 | 39.0 | 39.0 | 39.0 | 6 | 15 | 39.0 | 44.0 | 6 | 15 | 29.0 | 30.0 | 6 | 7.5 | 5 | 6 | 27.9 | 64 | 76 | 88 | 6 | 7 | 34.0 | 40.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | |
| 50 FT | 19 | 21 | 8 | 8 | 6 | 7 | 5 | 6 | 32.9 | 39.0 | 39.0 | 39.0 | 6 | 14 | 39.0 | 44.0 | 6 | 14 | 29.0 | 30.0 | 6 | 7.5 | 6 | 7.5 | 31.0 | 65 | 77 | 89 | 6 | 7.5 | 34.0 | 40.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | |

| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|------|------|---------|------|---------|----------------------------|-----------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | | | | | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 8 | 8 | 8 | 5 | 7.5 | 4 | 8 | 41.1 | 28.0 | 28.0 | 4 | 16 | 72.5 | 54.5 | 4 | 16 | 25.0 | 26.0 | 4 | 8 | 4 | 6 | 57.4 | 88 | 100 | 4 | 6 | 37.0 | 37.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 12 | 8 | 8 | 8 | 5 | 7.5 | 4 | 7.5 | 41.1 | 28.0 | 28.0 | 4 | 15 | 72.5 | 54.5 | 4 | 15 | 25.0 | 25.0 | 4 | 7 | 5 | 6.5 | 51.3 | 88 | 100 | 5 | 7 | 36.0 | 37.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 9 | 8 | 4 | 6 | 4 | 6 | 41.8 | 24.0 | 24.0 | 5 | 17 | 73.5 | 58.0 | 5 | 17 | 23.0 | 23.0 | 4 | 7 | 4 | 6.5 | 45.9 | 88 | 100 | 5 | 7 | 35.0 | 37.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 9 | 8 | 4 | 6.5 | 4 | 6 | 44.3 | 24.0 | 24.0 | 5 | 17 | 40.0 | 43.0 | 5 | 17 | 22.0 | 22.0 | 4 | 6.5 | 5 | 6.5 | 41.8 | 88 | 100 | 5 | 6.5 | 34.0 | 36.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 8 | 9 | 8 | 4 | 6.5 | 4 | 6 | 40.9 | 24.0 | 24.0 | 5 | 17 | 37.0 | 38.0 | 5 | 17 | 22.0 | 23.0 | 5 | 9 | 5 | 6 | 39.9 | 88 | 100 | 5 | 6 | 33.0 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 9 | 9 | 8 | 4 | 6 | 5 | 6.5 | 39.1 | 24.0 | 28.0 | 5 | 16 | 35.0 | 37.0 | 5 | 16 | 23.0 | 23.0 | 5 | 9 | 5 | 7 | 39.4 | 89 | 101 | 5 | 6.5 | 33.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 9 | 9 | 8 | 4 | 6 | 6 | 7 | 41.0 | 24.0 | 28.0 | 5 | 15 | 34.0 | 36.0 | 5 | 15 | 23.0 | 24.0 | 5 | 7 | 5 | 6 | 38.3 | 89 | 101 | 5 | 6 | 32.0 | 35.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 14 FT | 9 | 10 | 9 | 8 | 5 | 8.5 | 5 | 6 | 37.8 | 25.0 | 29.0 | 5 | 15 | 34.0 | 36.0 | 5 | 15 | 23.0 | 23.0 | 5 | 7.5 | 5 | 6.5 | 37.9 | 90 | 102 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 16 FT | 10 | 11 | 9 | 8 | 5 | 8 | 5 | 7 | 37.4 | 26.0 | 30.0 | 5 | 15 | 33.0 | 36.0 | 5 | 15 | 22.0 | 22.0 | 5 | 7.5 | 5 | 7 | 37.6 | 91 | 103 | 5 | 6.5 | 32.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 18 FT | 10 | 11 | 9 | 8 | 5 | 8 | 5 | 6.5 | 36.8 | 30.0 | 30.0 | 5 | 15 | 33.0 | 36.0 | 5 | 15 | 23.0 | 23.0 | 5 | 6 | 5 | 6.5 | 36.9 | 91 | 103 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | |
| 20 FT | 11 | 12 | 9 | 8 | 5 | 7.5 | 5 | 6.5 | 36.8 | 31.0 | 31.0 | 5 | 14 | 32.0 | 36.0 | 5 | 14 | 21.0 | 22.0 | 5 | 7 | 5 | 6.5 | 37.0 | 92 | 104 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | |
| 22 FT | 11 | 13 | 9 | 8 | 5 | 7 | 5 | 6 | 36.5 | 31.0 | 31.0 | 5 | 14 | 32.0 | 35.0 | 5 | 14 | 22.0 | 23.0 | 5 | 7 | 5 | 7 | 37.0 | 93 | 105 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | |
| 24 FT | 12 | 13 | 9 | 8 | 5 | 7 | 5 | 7 | 34.8 | 32.0 | 32.0 | 5 | 13 | 31.0 | 35.0 | 5 | 13 | 21.0 | 22.0 | 5 | 6 | 5 | 7 | 35.0 | 93 | 105 | 6 | 8 | 34.0 | 39.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | |
| 26 FT | 13 | 14 | 9 | 8 | 5 | 7 | 5 | 7 | 34.9 | 33.0 | 33.0 | 5 | 12 | 31.0 | 35.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6.5 | 5 | 7.5 | 35.3 | 94 | 106 | 5 | 6 | 31.0 | 36.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 28 FT | 13 | 15 | 9 | 8 | 5 | 6.5 | 5 | 6.5 | 34.9 | 33.0 | 33.0 | 5 | 12 | 31.0 | 35.0 | 5 | 12 | 21.0 | 22.0 | 5 | 6.5 | 5 | 7.5 | 35.4 | 95 | 107 | 5 | 6 | 31.0 | 36.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 30 FT | 14 | 15 | 9 | 8 | 5 | 6.5 | 5 | 7 | 35.0 | 34.0 | 34.0 | 5 | 12 | 31.0 | 35.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6 | 5 | 7 | 35.4 | 95 | 107 | 6 | 8 | 34.0 | 39.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 32 FT | 14 | 16 | 9 | 8 | 5 | 6 | 5 | 6 | 35.0 | 34.0 | 34.0 | 5 | 12 | 31.0 | 35.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6 | 5 | 7 | 35.5 | 96 | 108 | 6 | 8 | 35.0 | 39.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 34 FT | 15 | 17 | 10 | 8 | 5 | 6 | 5 | 7 | 40.8 | 35.0 | 35.0 | 6 | 16 | 40.0 | 44.0 | 6 | 16 | 29.0 | 30.0 | 5 | 6 | 5 | 7.5 | 36.0 | 97 | 109 | 6 | 8.5 | 35.0 | 40.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 36 FT | 16 | 17 | 10 | 8 | 5 | 6 | 5 | 7 | 40.8 | 36.0 | 36.0 | 6 | 17 | 39.0 | 44.0 | 6 | 17 | 29.0 | 30.0 | 5 | 6 | 5 | 7.5 | 36.0 | 97 | 109 | 6 | 8 | 35.0 | 40.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 38 FT | 16 | 18 | 11 | 8 | 5 | 6 | 5 | 7 | 41.5 | 36.0 | 36.0 | 6 | 16 | 39.0 | 44.0 | 6 | 16 | 29.0 | 30.0 | 5 | 6 | 5 | 7 | 36.5 | 98 | 110 | 6 | 8 | 35.0 | 40.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 40 FT | 17 | 18 | 11 | 8 | 5 | 6 | 5 | 7 | 41.5 | 37.0 | 37.0 | 6 | 16 | 39.0 | 43.0 | 6 | 16 | 29.0 | 30.0 | 6 | 8 | 5 | 7 | 36.5 | 98 | 110 | 6 | 7.5 | 35.0 | 40.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 42 FT | 17 | 19 | 11 | 8 | 6 | 8 | 5 | 6.5 | 41.6 | 37.0 | 37.0 | 6 | 16 | 39.0 | 43.0 | 6 | 16 | 29.0 | 30.0 | 6 | 8.5 | 5 | 7 | 36.8 | 99 | 111 | 6 | 7.5 | 35.0 | 40.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 44 FT | 18 | 19 | 12 | 8 | 6 | 8 | 5 | 6.5 | 42.3 | 38.0 | 38.0 | 6 | 16 | 39.0 | 43.0 | 6 | 16 | 29.0 | 29.0 | 6 | 8 | 5 | 6.5 | 37.0 | 99 | 111 | 6 | 7.5 | 35.0 | 40.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 46 FT | 18 | 20 | 12 | 8 | 6 | 8 | 5 | 6.5 | 42.4 | 38.0 | 38.0 | 6 | 15 | 39.0 | 43.0 | 6 | 15 | 29.0 | 29.0 | 6 | 8 | 5 | 6.5 | 37.1 | 100 | 112 | 6 | 7.5 | 35.0 | 40.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 48 FT | 18 | 20 | 12 | 8 | 6 | 7.5 | 5 | 6.5 | 42.4 | 38.0 | 38.0 | 6 | 15 | 39.0 | 43.0 | 6 | 15 | 29.0 | 29.0 | 6 | 7.5 | 5 | 6.5 | 37.1 | 100 | 112 | 6 | 7 | 35.0 | 40.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 50 FT | 19 | 21 | 12 | 8 | 6 | 7.5 | 5 | 6 | 42.5 | 39.0 | 39.0 | 6 | 15 | 39.0 | 43.0 | 6 | 15 | 28.0 | 29.0 | 6 | 8 | 5 | 6.5 | 37.5 | 101 | 113 | 6 | 7.5 | 35.0 | 40.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |

| SPAN (S) = 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|------|------|------|---------|------|------|------|---------|------|------------------|----|-------|--------|---------|------|----|-----|---------|------|---------|-----------------------------|-----------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=9' | HT=10' | | | | | | | | | | | | HT=9' | HT=10' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 8 | 5 | 7.5 | 5 | 9 | 41.1 | 28.0 | 32.0 | 4 | 16 | 72.5 | 54.5 | 4 | 16 | 26.0 | 27.0 | 4 | 8 | 5 | 6 | 60.0 | 113 | 125 | 4 | 7 | 58.0 | 38.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 2 FT | 12 | 9 | 8 | 8 | 5 | 7 | 5 | 8.5 | 41.1 | 28.0 | 32.0 | 4 | 15 | 72.5 | 54.5 | 4 | 15 | 25.0 | 26.0 | 4 | 7.5 | 6 | 7 | 63.0 | 113 | 125 | 4 | 6.5 | 39.0 | 38.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | |
| 4 FT | 8 | 9 | 9 | 8 | 4 | 6 | 5 | 6 | 44.8 | 24.0 | 28.0 | 5 | 17 | 75.5 | 58.0 | 5 | 17 | 23.0 | 23.0 | 4 | 7 | 5 | 6 | 60.8 | 113 | 125 | 4 | 6 | 37.0 | 38.0 | 5 | 12 | 5 | 11 | 12 | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 10 | 8 | 4 | 6.5 | 5 | 6.5 | 59.1 | 24.0 | 28.0 | 5 | 17 | 45.0 | 43.0 | 5 | 17 | 22.0 | 22.0 | 4 | 7 | 5 | 6.5 | 56.3 | 113 | 125 | 5 | 7.5 | 34.0 | 37.0 | 5 | 12 | 5 | 11 | 12 | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 10 | 8 | 4 | 6.5 | 5 | 6.5 | 50.8 | 28.0 | 28.0 | 5 | 17 | 38.0 | 38.0 | 5 | 17 | 22.0 | 22.0 | 4 | 6.5 | 5 | 6 | 51.8 | 113 | 125 | 5 | 7 | 33.0 | 36.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | |
| 10 FT | 8 | 9 | 10 | 8 | 4 | 6 | 6 | 7.5 | 50.9 | 28.0 | 32.0 | 5 | 16 | 36.0 | 37.0 | 5 | 16 | 23.0 | 23.0 | 5 | 9 | 6 | 6.5 | 52.6 | 113 | 125 | 5 | 6 | 33.0 | 36.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | |
| 12 FT | 8 | 10 | 10 | 8 | 4 | 6 | 6 | 6.5 | 48.5 | 28.0 | 32.0 | 5 | 15 | 35.0 | 36.0 | 5 | 15 | 23.0 | 24.0 | 5 | 8.5 | 6 | 7 | 53.1 | 114 | 126 | 5 | 6.5 | 33.0 | 36.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 14 FT | 9 | 10 | 10 | 8 | 5 | 8.5 | 5 | 6 | 46.4 | 29.0 | 29.0 | 5 | 16 | 34.0 | 36.0 | 5 | 16 | 23.0 | 23.0 | 5 | 8 | 6 | 7 | 51.3 | 114 | 126 | 5 | 6 | 33.0 | 36.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 16 FT | 9 | 11 | 10 | 8 | 5 | 8 | 5 | 6 | 44.8 | 29.0 | 29.0 | 5 | 15 | 33.0 | 35.0 | 5 | 15 | 23.0 | 24.0 | 5 | 7.5 | 6 | 7 | 51.8 | 115 | 127 | 5 | 6 | 33.0 | 36.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 18 FT | 10 | 12 | 10 | 8 | 5 | 8 | 5 | 6.5 | 45.3 | 30.0 | 30.0 | 5 | 15 | 33.0 | 35.0 | 5 | 15 | 22.0 | 23.0 | 5 | 7.5 | 6 | 7 | 51.8 | 116 | 128 | 5 | 6.5 | 33.0 | 36.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 20 FT | 11 | 12 | 10 | 8 | 5 | 7.5 | 5 | 6 | 46.1 | 31.0 | 31.0 | 5 | 14 | 33.0 | 35.0 | 5 | 14 | 21.0 | 22.0 | 5 | 7 | 6 | 6.5 | 50.8 | 116 | 128 | 5 | 6 | 33.0 | 36.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 22 FT | 11 | 13 | 10 | 8 | 5 | 7.5 | 5 | 6 | 45.4 | 31.0 | 31.0 | 5 | 14 | 32.0 | 35.0 | 5 | 14 | 22.0 | 23.0 | 5 | 7 | 6 | 6.5 | 51.4 | 117 | 129 | 5 | 6 | 33.0 | 36.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 24 FT | 12 | 13 | 10 | 8 | 5 | 7 | 5 | 6 | 43.4 | 32.0 | 32.0 | 5 | 13 | 31.0 | 35.0 | 5 | 13 | 21.0 | 22.0 | 5 | 6 | 6 | 6.5 | 48.0 | 117 | 129 | 6 | 8 | 35.0 | 39.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 26 FT | 12 | 14 | 10 | 8 | 5 | 7 | 6 | 7.5 | 46.1 | 32.0 | 36.0 | 5 | 13 | 31.0 | 35.0 | 5 | 13 | 21.0 | 22.0 | 5 | 6.5 | 6 | 7 | 48.6 | 118 | 130 | 6 | 8.5 | 35.0 | 39.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 28 FT | 13 | 15 | 11 | 8 | 5 | 6.5 | 5 | 6 | 43.6 | 33.0 | 33.0 | 5 | 12 | 31.0 | 35.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6.5 | 5 | 6.5 | 45.9 | 119 | 131 | 5 | 6 | 32.0 | 36.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 30 FT | 14 | 15 | 11 | 8 | 5 | 6.5 | 5 | 6 | 44.3 | 34.0 | 34.0 | 5 | 12 | 31.0 | 35.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6 | 5 | 6 | 45.5 | 119 | 131 | 6 | 8 | 35.0 | 39.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 32 FT | 14 | 16 | 12 | 8 | 5 | 6.5 | 5 | 6 | 44.1 | 34.0 | 34.0 | 5 | 12 | 31.0 | 34.0 | 5 | 12 | 20.0 | 21.0 | 5 | 6.5 | 5 | 6 | 45.9 | 120 | 132 | 6 | 8 | 35.0 | 40.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 34 FT | 15 | 17 | 12 | 8 | 5 | 6.5 | 5 | 6 | 49.6 | 35.0 | 35.0 | 6 | 17 | 40.0 | 43.0 | 6 | 17 | 29.0 | 30.0 | 5 | 6.5 | 5 | 6.5 | 46.5 | 121 | 133 | 6 | 8 | 36.0 | 40.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 36 FT | 15 | 17 | 13 | 8 | 5 | 6 | 5 | 6 | 49.6 | 35.0 | 35.0 | 6 | 16 | 40.0 | 43.0 | 6 | 16 | 29.0 | 30.0 | 5 | 6 | 5 | 6 | 46.0 | 121 | 133 | 6 | 7.5 | 35.0 | 40.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 38 FT | 16 | 18 | 13 | 8 | 5 | 6 | 6 | 8.5 | 54.1 | 36.0 | 36.0 | 6 | 16 | 40.0 | 43.0 | 6 | 16 | 29.0 | 29.0 | 5 | 6 | 5 | 6 | 46.6 | 122 | 134 | 6 | 8 | 36.0 | 40.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 40 FT | 16 | 18 | 13 | 8 | 6 | 8.5 | 6 | 8 | 54.0 | 36.0 | 36.0 | 6 | 15 | 40.0 | 43.0 | 6 | 15 | 29.0 | 30.0 | 5 | 6 | 5 | 6 | 46.5 | 122 | 134 | 6 | 7.5 | 36.0 | 40.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 42 FT | 17 | 19 | 14 | 8 | 5 | 6 | 6 | 8 | 54.8 | 37.0 | 37.0 | 6 | 16 | 39.0 | 42.0 | 6 | 16 | 29.0 | 29.0 | 5 | 6 | 5 | 6 | 46.9 | 123 | 135 | 6 | 7.5 | 36.0 | 40.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 44 FT | 17 | 19 | 14 | 8 | 6 | 8 | 6 | 8 | 54.6 | 37.0 | 37.0 | 6 | 15 | 39.0 | 42.0 | 6 | 15 | 29.0 | 29.0 | 6 | 8 | 5 | 6 | 46.8 | 123 | 135 | 6 | 7 | 36.0 | 40.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 46 FT | 18 | 20 | 14 | 8 | 6 | 8 | 6 | 7.5 | 55.3 | 38.0 | 38.0 | 6 | 16 | 39.0 | 42.0 | 6 | 16 | 28.0 | 29.0 | 6 | 8 | 5 | 6 | 47.3 | 124 | 136 | 6 | 7.5 | 36.0 | 40.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 48 FT | 18 | 20 | 15 | 8 | 6 | 7.5 | 6 | 8 | 55.4 | 38.0 | 42.0 | 6 | 15 | 39.0 | 42.0 | 6 | 15 | 28.0 | 29.0 | 6 | 7.5 | 6 | 8 | 50.0 | 124 | 136 | 6 | 7 | 36.0 | 40.0 | 5 | 12 | 6 | 8.5 | 0 | | | | | | | | | | | | |
| 50 FT | 18 | 21 | 15 | 8 | 6 | 7 | 6 | 7.5 | 55.4 | 38.0 | 42.0 | 6 | 14 | 39.0 | 42.0 | 6 | 14 | 28.0 | 29.0 | 6 | 8 | 6 | 8 | 50.6 | 125 | 137 | 6 | 7 | 36.0 | 40.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 7 FEET
HEIGHT (HT): 9 THRU 10 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
9 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 4 FT OR 5 FT OR 6 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|------|------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|-------|---------|------|------|------------------------------------|---------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | | | | | | | HT=4' | HT=5' | HT=6' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 8 | 8 | 8 | 5 | 7 | 4 | 8.5 | 44.8 | 28.0 | 28.0 | 28.0 | 4 | 13 | 81.5 | 60.5 | 4 | 13 | 27.0 | 23.0 | 4 | 7.5 | 4 | 6.5 | 42.0 | 52 | 64 | 76 | 5 | 7 | 39.0 | 40.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 12 | 8 | 8 | 8 | 5 | 7 | 4 | 8.5 | 44.8 | 28.0 | 28.0 | 28.0 | 4 | 12 | 81.5 | 60.5 | 4 | 12 | 26.0 | 25.0 | 4 | 6.5 | 4 | 6 | 38.8 | 52 | 64 | 76 | 5 | 6.5 | 38.0 | 40.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 6 | 5 | 6 | 40.6 | 24.0 | 24.0 | 24.0 | 5 | 16 | 50.0 | 64.0 | 5 | 16 | 27.0 | 27.0 | 4 | 6 | 4 | 6 | 35.4 | 52 | 64 | 76 | 5 | 6 | 38.0 | 40.0 | 5 | 11 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 8 | 8 | 8 | 4 | 6 | 5 | 6.5 | 36.5 | 28.0 | 24.0 | 28.0 | 5 | 15 | 42.0 | 45.0 | 5 | 15 | 26.0 | 26.0 | 5 | 8.5 | 5 | 6.5 | 33.5 | 52 | 64 | 76 | 6 | 7 | 39.0 | 41.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 8 | 8 | 4 | 6 | 5 | 6 | 34.4 | 24.0 | 24.0 | 24.0 | 5 | 14 | 39.0 | 41.0 | 5 | 14 | 25.0 | 25.0 | 5 | 8 | 4 | 6.5 | 31.9 | 53 | 65 | 77 | 5 | 6 | 36.0 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 4 | 6 | 32.6 | 25.0 | 25.0 | 25.0 | 5 | 15 | 38.0 | 41.0 | 5 | 15 | 25.0 | 25.0 | 5 | 8 | 4 | 7.5 | 30.5 | 54 | 66 | 78 | 5 | 6 | 35.0 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 31.6 | 25.0 | 25.0 | 25.0 | 5 | 14 | 37.0 | 40.0 | 5 | 14 | 24.0 | 25.0 | 5 | 7 | 4 | 6.5 | 29.8 | 54 | 66 | 78 | 6 | 7 | 38.0 | 42.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 7.5 | 30.5 | 26.0 | 26.0 | 26.0 | 5 | 14 | 36.0 | 40.0 | 5 | 14 | 24.0 | 25.0 | 5 | 6.5 | 4 | 6.5 | 29.0 | 55 | 67 | 79 | 5 | 6 | 34.0 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 8.5 | 29.6 | 27.0 | 27.0 | 27.0 | 5 | 14 | 35.0 | 40.0 | 5 | 14 | 24.0 | 25.0 | 5 | 6.5 | 4 | 6.5 | 28.4 | 56 | 68 | 80 | 5 | 6 | 34.0 | 39.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 11 | 13 | 8 | 8 | 5 | 7.5 | 5 | 8 | 29.5 | 27.0 | 27.0 | 27.0 | 5 | 13 | 35.0 | 39.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 4 | 6.5 | 27.6 | 57 | 69 | 81 | 6 | 8 | 37.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 12 | 14 | 8 | 8 | 5 | 7 | 5 | 8.5 | 28.8 | 28.0 | 28.0 | 28.0 | 5 | 13 | 35.0 | 39.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 4 | 6.5 | 27.3 | 58 | 70 | 82 | 6 | 8 | 36.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 28.1 | 29.0 | 29.0 | 29.0 | 5 | 12 | 34.0 | 40.0 | 5 | 12 | 23.0 | 24.0 | 6 | 8 | 4 | 6 | 27.4 | 58 | 70 | 82 | 6 | 7.5 | 37.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8.5 | 27.9 | 30.0 | 30.0 | 30.0 | 5 | 12 | 34.0 | 40.0 | 5 | 12 | 22.0 | 23.0 | 6 | 8 | 4 | 6 | 27.3 | 59 | 71 | 83 | 6 | 7.5 | 36.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 15 | 16 | 8 | 8 | 6 | 8.5 | 5 | 8 | 32.6 | 31.0 | 31.0 | 31.0 | 6 | 16 | 42.0 | 49.0 | 6 | 16 | 30.0 | 32.0 | 6 | 8 | 4 | 6 | 27.3 | 60 | 72 | 84 | 6 | 7.5 | 36.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 8 | 31.6 | 31.0 | 31.0 | 31.0 | 6 | 16 | 42.0 | 48.0 | 6 | 16 | 31.0 | 32.0 | 6 | 7.5 | 4 | 6 | 26.1 | 60 | 72 | 84 | 6 | 7 | 36.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 7 | 31.5 | 32.0 | 32.0 | 32.0 | 6 | 15 | 42.0 | 48.0 | 6 | 15 | 30.0 | 31.0 | 6 | 7.5 | 4 | 6 | 26.3 | 61 | 73 | 85 | 6 | 7 | 36.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 16 | 18 | 8 | 8 | 6 | 7.5 | 5 | 7 | 31.6 | 32.0 | 36.0 | 36.0 | 6 | 15 | 42.0 | 48.0 | 6 | 15 | 31.0 | 32.0 | 6 | 7.5 | 5 | 6.5 | 26.1 | 62 | 74 | 86 | 6 | 7 | 36.0 | 43.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 17 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 31.6 | 37.0 | 37.0 | 37.0 | 6 | 14 | 42.0 | 48.0 | 6 | 14 | 30.0 | 31.0 | 6 | 7.5 | 5 | 6.5 | 26.3 | 63 | 75 | 87 | 6 | 7 | 36.0 | 43.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 18 | 19 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 31.5 | 38.0 | 38.0 | 38.0 | 6 | 14 | 42.0 | 48.0 | 6 | 14 | 30.0 | 31.0 | 6 | 7.5 | 5 | 6.5 | 26.4 | 63 | 75 | 87 | 6 | 7 | 36.0 | 43.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 18 | 20 | 8 | 8 | 6 | 7 | 5 | 6.5 | 31.6 | 38.0 | 38.0 | 38.0 | 6 | 13 | 42.0 | 48.0 | 6 | 13 | 30.0 | 31.0 | 6 | 7.5 | 5 | 6 | 26.4 | 64 | 76 | 88 | 6 | 7 | 36.0 | 43.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 19 | 20 | 8 | 8 | 6 | 7 | 5 | 6 | 31.6 | 39.0 | 39.0 | 39.0 | 6 | 13 | 42.0 | 48.0 | 6 | 13 | 29.0 | 31.0 | 6 | 6.5 | 5 | 6 | 26.5 | 64 | 76 | 88 | 6 | 6.5 | 36.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 19 | 21 | 8 | 8 | 6 | 6 | 5 | 6 | 31.8 | 39.0 | 39.0 | 39.0 | 6 | 12 | 42.0 | 48.0 | 6 | 12 | 30.0 | 31.0 | 6 | 7 | 6 | 7.5 | 29.6 | 65 | 77 | 89 | 6 | 6.5 | 36.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 20 | 22 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 35.9 | 44.0 | 44.0 | 44.0 | 6 | 13 | 41.0 | 48.0 | 6 | 13 | 29.0 | 30.0 | 6 | 7 | 6 | 7 | 29.8 | 66 | 78 | 90 | 6 | 6.5 | 36.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 21 | 22 | 8 | 8 | 6 | 6.5 | 6 | 7 | 35.8 | 45.0 | 45.0 | 45.0 | 6 | 13 | 41.0 | 48.0 | 6 | 13 | 29.0 | 30.0 | 6 | 6.5 | 6 | 7 | 29.9 | 66 | 78 | 90 | 6 | 6.5 | 36.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 21 | 23 | 8 | 8 | 6 | 6.5 | 6 | 7 | 36.0 | 45.0 | 45.0 | 45.0 | 6 | 13 | 41.0 | 48.0 | 6 | 13 | 29.0 | 30.0 | 6 | 7 | 6 | 6.5 | 30.0 | 67 | 79 | 91 | 6 | 6.5 | 36.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 22 | 23 | 8 | 8 | 6 | 6.5 | 6 | 6.5 | 35.9 | 46.0 | 46.0 | 46.0 | 6 | 13 | 41.0 | 47.0 | 6 | 13 | 29.0 | 30.0 | 6 | 6.5 | 6 | 6.5 | 30.1 | 67 | 79 | 91 | 6 | 6 | 36.0 | 43.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|-------|---------|------|------|------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|-------|---------|------|------|------|------------------------------------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 8 | 5 | 7 | 4 | 6 | 44.8 | 28.0 | 28.0 | 28.0 | 4 | 13 | 81.5 | 60.5 | 4 | 13 | 27.0 | 25.0 | 4 | 7.5 | 4 | 6 | 66.0 | 89 | 101 | 113 | 5 | 8 | 41.0 | 41.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 12 | 9 | 8 | 8 | 5 | 7 | 4 | 6 | 44.8 | 28.0 | 28.0 | 28.0 | 4 | 12 | 81.5 | 60.5 | 4 | 12 | 26.0 | 24.0 | 4 | 6.5 | 5 | 6.5 | 61.3 | 89 | 101 | 113 | 5 | 7.5 | 39.0 | 41.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 8 | 8 | 8 | 8 | 4 | 6 | 6 | 7.5 | 47.8 | 28.0 | 32.0 | 32.0 | 5 | 16 | 83.5 | 64.0 | 5 | 16 | 27.0 | 28.0 | 5 | 8.5 | 6 | 6 | 55.0 | 88 | 100 | 112 | 5 | 6 | 38.0 | 40.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 8 | 8 | 4 | 6 | 6 | 7.5 | 52.5 | 24.0 | 28.0 | 32.0 | 5 | 15 | 44.0 | 47.0 | 5 | 15 | 26.0 | 26.0 | 5 | 8.5 | 6 | 6.5 | 52.3 | 89 | 101 | 113 | 5 | 6.5 | 37.0 | 40.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 8 | 9 | 8 | 8 | 4 | 6 | 6 | 7.5 | 47.4 | 24.0 | 28.0 | 32.0 | 5 | 14 | 40.0 | 42.0 | 5 | 14 | 25.0 | 25.0 | 5 | 7.5 | 6 | 6 | 48.1 | 89 | 101 | 113 | 5 | 6 | 36.0 | 39.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 6 | 7 | 46.3 | 25.0 | 29.0 | 33.0 | 5 | 15 | 39.0 | 41.0 | 5 | 15 | 25.0 | 25.0 | 5 | 7.5 | 6 | 6.5 | 46.9 | 90 | 102 | 114 | 5 | 6 | 35.0 | 39.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 6 | 7 | 44.8 | 29.0 | 33.0 | 33.0 | 5 | 14 | 37.0 | 40.0 | 5 | 14 | 24.0 | 25.0 | 5 | 6.5 | 6 | 6 | 45.4 | 90 | 102 | 114 | 6 | 7 | 38.0 | 42.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 10 | 11 | 8 | 8 | 5 | 8 | 6 | 6.5 | 44.1 | 30.0 | 30.0 | 34.0 | 5 | 14 | 37.0 | 40.0 | 5 | 14 | 24.0 | 25.0 | 5 | 6.5 | 6 | 6 | 44.9 | 91 | 103 | 115 | 5 | 6 | 35.0 | 39.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 6 | 6.5 | 43.6 | 31.0 | 31.0 | 35.0 | 5 | 14 | 36.0 | 40.0 | 5 | 14 | 24.0 | 25.0 | 5 | 6.5 | 6 | 6.5 | 44.4 | 92 | 104 | 116 | 5 | 6 | 34.0 | 39.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 11 | 13 | 8 | 8 | 5 | 7.5 | 6 | 6 | 42.8 | 31.0 | 31.0 | 35.0 | 5 | 13 | 35.0 | 39.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 6 | 6.5 | 43.9 | 93 | 105 | 117 | 6 | 8 | 37.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 12 | 14 | 8 | 8 | 5 | 7 | 6 | 6 | 42.4 | 32.0 | 32.0 | 36.0 | 5 | 13 | 35.0 | 39.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6 | 6 | 6.5 | 43.4 | 94 | 106 | 118 | 6 | 8 | 37.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 6 | 6 | 42.1 | 33.0 | 33.0 | 37.0 | 5 | 12 | 35.0 | 39.0 | 5 | 12 | 23.0 | 24.0 | 6 | 8 | 6 | 6 | 43.0 | 94 | 106 | 118 | 6 | 7.5 | 37.0 | 43.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 14 | 15 | 10 | 8 | 5 | 6 | 5 | 6.5 | 40.0 | 34.0 | 34.0 | 34.0 | 5 | 12 | 34.0 | 39.0 | 5 | 12 | 22.0 | 23.0 | 6 | 8.5 | 5 | 7 | 40.4 | 95 | 107 | 119 | 6 | 7 | 37.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 14 | 16 | 10 | 8 | 5 | 6 | 5 | 6 | 39.8 | 34.0 | 34.0 | 34.0 | 5 | 12 | 34.0 | 39.0 | 5 | 12 | 22.0 | 24.0 | 6 | 8 | 5 | 7 | 40.4 | 96 | 108 | 120 | 6 | 7.5 | 37.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 15 | 16 | 10 | 8 | 6 | 8 | 5 | 6.5 | 43.0 | 35.0 | 35.0 | 35.0 | 6 | 16 | 42.0 | 48.0 | 6 | 16 | 30.0 | 32.0 | 6 | 7.5 | 5 | 7 | 38.4 | 96 | 108 | 120 | 6 | 7 | 37.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 15 | 17 | 11 | 8 | 6 | 7.5 | 5 | 6.5 | 43.5 | 31.0 | 35.0 | 35.0 | 6 | 15 | 42.0 | 47.0 | 6 | 15 | 31.0 | 32.0 | 6 | 8 | 5 | 7 | 38.8 | 97 | 109 | 121 | 6 | 7 | 37.0 | 43.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 16 | 18 | 11 | 8 | 6 | 8 | 5 | 6 | 43.8 | 32.0 | 36.0 | 36.0 | 6 | 15 | 42.0 | 47.0 | 6 | 15 | 30.0 | 32.0 | 6 | 8 | 5 | 7 | 39.0 | 98 | 110 | 122 | 6 | 7 | 37.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 17 | 19 | 11 | 8 | 6 | 7.5 | 5 | 6 | 43.9 | 33.0 | 37.0 | 37.0 | 6 | 14 | 42.0 | 47.0 | 6 | 14 | 30.0 | 31.0 | 6 | 8 | 5 | 7 | 39.3 | 99 | 111 | 123 | 6 | 7 | 37.0 | 43.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 17 | 19 | 12 | 8 | 6 | 7 | 5 | 6 | 44.4 | 33.0 | 37.0 | 37.0 | 6 | 14 | 42.0 | 47.0 | 6 | 14 | 30.0 | 31.0 | 6 | 7.5 | 5 | 6.5 | 39.3 | 99 | 111 | 123 | 6 | 6.5 | 37.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 18 | 20 | 12 | 8 | 6 | 7.5 | 5 | 6 | 44.6 | 38.0 | 38.0 | 38.0 | 6 | 13 | 42.0 | 47.0 | 6 | 13 | 29.0 | 31.0 | 6 | 7.5 | 5 | 6.5 | 39.6 | 100 | 112 | 124 | 6 | 6.5 | 37.0 | 43.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 19 | 20 | 12 | 8 | 6 | 7 | 5 | 6 | 44.6 | 39.0 | 39.0 | 39.0 | 6 | 14 | 42.0 | 47.0 | 6 | 14 | 29.0 | 30.0 | 6 | 6.5 | 5 | 6.5 | 39.6 | 100 | 112 | 124 | 6 | 6.5 | 37.0 | 43.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 19 | 21 | 12 | 8 | 6 | 7 | 6 | 7.5 | 48.8 | 39.0 | 39.0 | 39.0 | 6 | 13 | 42.0 | 47.0 | 6 | 13 | 29.0 | 30.0 | 6 | 7 | 5 | 6.5 | 39.8 | 101 | 113 | 125 | 6 | 6.5 | 37.0 | 43.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 20 | 22 | 13 | 8 | 6 | 7 | 5 | 6 | 45.5 | 40.0 | 40.0 | 40.0 | 6 | 14 | 41.0 | 46.0 | 6 | 14 | 29.0 | 30.0 | 6 | 7 | 5 | 6 | 40.3 | 102 | 114 | 126 | 6 | 6.5 | 37.0 | 44.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 20 | 22 | 13 | 8 | 6 | 6.5 | 6 | 8 | 49.5 | 40.0 | 40.0 | 40.0 | 6 | 13 | 41.0 | 46.0 | 6 | 13 | 29.0 | 30.0 | 6 | 7 | 5 | 6 | 40.3 | 102 | 114 | 126 | 6 | 6 | 37.0 | 44.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 21 | 23 | 13 | 8 | 6 | 6.5 | 6 | 8 | 49.6 | 41.0 | 41.0 | 41.0 | 6 | 13 | 41.0 | 46.0 | 6 | 13 | 29.0 | 30.0 | 6 | 7 | 5 | 6 | 40.5 | 103 | 115 | 127 | 6 | 6.5 | 37.0 | 44.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 21 | 23 | 13 | 8 | 6 | 6.5 | 6 | 7 | 49.6 | 41.0 | 41.0 | 41.0 | 6 | 13 | 41.0 | 46.0 | 6 | 13 | 29.0 | 30.0 | 6 | 6 | 5 | 6 | 40.5 | 103 | 115 | 127 | 6 | 6 | 37.0 | 44.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 8 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT | | | | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|--------|------|------|---------|------|-----------|------|------------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=10' | HT=11' | | | | | | | | | | | | | | HT=10' | HT=11' | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 12 | 9 | 8 | 9 | 5 | 7 | 5 | 7 | 44.9 | 32.0 | 32.0 | 4 | 13 | 81.5 | 61.5 | 4 | 13 | 28.0 | 26.0 | 4 | 6.5 | 6 | 6 | 69.3 | 125 | 137 | 5 | 7.5 | 43.0 | 42.0 | 5 | 11.5 | 5 | 10 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 12 | 9 | 9 | 9 | 5 | 7 | 5 | 8 | 45.5 | 32.0 | 32.0 | 4 | 12 | 82.5 | 61.5 | 4 | 12 | 27.0 | 24.0 | 4 | 6.5 | 6 | 6.5 | 70.0 | 125 | 137 | 5 | 7 | 41.0 | 41.0 | 5 | 11.5 | 5 | 10.5 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 8 | 9 | 10 | 9 | 4 | 6 | 6 | 7 | 49.1 | 28.0 | 28.0 | 5 | 16 | 84.5 | 65.0 | 5 | 16 | 27.0 | 27.0 | 4 | 6 | 5 | 6 | 65.8 | 125 | 137 | 5 | 7 | 39.0 | 41.0 | 5 | 11.5 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 8 | 9 | 11 | 9 | 4 | 6 | 5 | 6 | 57.1 | 28.0 | 28.0 | 5 | 16 | 44.0 | 44.0 | 5 | 16 | 26.0 | 26.0 | 5 | 9 | 5 | 6 | 56.6 | 125 | 137 | 5 | 6.5 | 37.0 | 39.0 | 5 | 11.5 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 8 | 10 | 11 | 9 | 4 | 6 | 6 | 7 | 54.8 | 28.0 | 28.0 | 5 | 15 | 41.0 | 41.0 | 5 | 15 | 25.0 | 26.0 | 5 | 9 | 5 | 6.5 | 56.4 | 126 | 138 | 5 | 6.5 | 37.0 | 39.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 8 | 10 | 11 | 9 | 4 | 6 | 6 | 6.5 | 51.9 | 28.0 | 28.0 | 5 | 14 | 39.0 | 40.0 | 5 | 14 | 25.0 | 25.0 | 5 | 7.5 | 5 | 6 | 54.0 | 126 | 138 | 5 | 6 | 36.0 | 39.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 9 | 11 | 11 | 9 | 5 | 8.5 | 6 | 7 | 52.5 | 29.0 | 29.0 | 5 | 14 | 38.0 | 39.0 | 5 | 14 | 25.0 | 25.0 | 5 | 7.5 | 5 | 6 | 53.9 | 127 | 139 | 5 | 6 | 36.0 | 39.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 10 | 11 | 11 | 9 | 5 | 8 | 5 | 6 | 50.1 | 30.0 | 30.0 | 5 | 15 | 37.0 | 39.0 | 5 | 15 | 25.0 | 25.0 | 5 | 7 | 5 | 6 | 51.9 | 127 | 139 | 5 | 6 | 35.0 | 39.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 10 | 12 | 11 | 9 | 5 | 7.5 | 5 | 6 | 48.3 | 30.0 | 30.0 | 5 | 13 | 36.0 | 39.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6.5 | 5 | 6 | 52.3 | 128 | 140 | 5 | 6 | 35.0 | 39.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 11 | 13 | 11 | 9 | 5 | 7.5 | 5 | 6.5 | 48.6 | 31.0 | 31.0 | 5 | 14 | 36.0 | 39.0 | 5 | 14 | 24.0 | 25.0 | 5 | 6.5 | 6 | 7 | 55.0 | 129 | 141 | 6 | 8 | 38.0 | 42.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 12 | 14 | 11 | 9 | 5 | 7 | 5 | 6 | 48.8 | 32.0 | 32.0 | 5 | 13 | 35.0 | 39.0 | 5 | 13 | 24.0 | 25.0 | 5 | 6.5 | 6 | 7 | 54.9 | 130 | 142 | 6 | 8 | 38.0 | 43.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 13 | 15 | 11 | 9 | 5 | 6.5 | 6 | 8 | 52.1 | 33.0 | 37.0 | 5 | 12 | 35.0 | 39.0 | 5 | 12 | 23.0 | 24.0 | 5 | 6 | 6 | 7 | 54.9 | 131 | 143 | 6 | 8 | 38.0 | 43.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 13 | 15 | 12 | 9 | 5 | 6.5 | 5 | 6 | 48.3 | 33.0 | 33.0 | 5 | 12 | 35.0 | 38.0 | 5 | 12 | 23.0 | 25.0 | 5 | 6 | 6 | 7.5 | 53.9 | 131 | 143 | 6 | 7 | 38.0 | 43.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 14 | 16 | 12 | 9 | 5 | 6 | 6 | 8 | 51.8 | 34.0 | 38.0 | 5 | 12 | 35.0 | 38.0 | 5 | 12 | 22.0 | 24.0 | 5 | 6 | 6 | 7.5 | 54.1 | 132 | 144 | 6 | 7.5 | 38.0 | 43.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 15 | 16 | 12 | 9 | 5 | 6 | 6 | 8 | 56.1 | 35.0 | 39.0 | 6 | 16 | 43.0 | 47.0 | 6 | 16 | 31.0 | 32.0 | 6 | 7.5 | 6 | 8 | 51.0 | 132 | 144 | 6 | 7 | 38.0 | 43.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 15 | 17 | 12 | 9 | 6 | 8 | 6 | 7 | 55.9 | 35.0 | 39.0 | 6 | 16 | 43.0 | 47.0 | 6 | 16 | 31.0 | 32.0 | 6 | 8 | 6 | 7.5 | 51.5 | 133 | 145 | 6 | 7 | 38.0 | 43.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 16 | 18 | 13 | 9 | 6 | 8 | 6 | 8 | 56.5 | 36.0 | 40.0 | 6 | 15 | 42.0 | 47.0 | 6 | 15 | 30.0 | 31.0 | 6 | 8 | 6 | 8.5 | 51.8 | 134 | 146 | 6 | 7 | 38.0 | 43.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 17 | 19 | 13 | 9 | 6 | 8 | 6 | 7.5 | 56.9 | 37.0 | 41.0 | 6 | 14 | 42.0 | 47.0 | 6 | 14 | 30.0 | 31.0 | 6 | 8 | 6 | 8.5 | 52.3 | 135 | 147 | 6 | 7 | 38.0 | 43.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 17 | 19 | 14 | 9 | 6 | 7.5 | 6 | 7.5 | 57.0 | 37.0 | 41.0 | 6 | 14 | 42.0 | 46.0 | 6 | 14 | 30.0 | 31.0 | 6 | 7.5 | 6 | 8 | 51.9 | 135 | 147 | 6 | 6.5 | 38.0 | 43.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 18 | 20 | 14 | 9 | 6 | 7.5 | 6 | 7.5 | 57.4 | 38.0 | 42.0 | 6 | 14 | 42.0 | 46.0 | 6 | 14 | 30.0 | 31.0 | 6 | 7.5 | 6 | 8 | 52.3 | 136 | 148 | 6 | 7 | 38.0 | 43.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 18 | 20 | 14 | 9 | 6 | 7 | 6 | 6.5 | 57.3 | 38.0 | 42.0 | 6 | 13 | 42.0 | 46.0 | 6 | 13 | 30.0 | 31.0 | 6 | 6.5 | 6 | 8 | 52.1 | 136 | 148 | 6 | 6.5 | 38.0 | 43.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 19 | 21 | 15 | 9 | 6 | 7 | 6 | 7 | 57.9 | 43.0 | 43.0 | 6 | 14 | 42.0 | 46.0 | 6 | 14 | 30.0 | 30.0 | 6 | 7 | 6 | 8 | 52.6 | 137 | 149 | 6 | 6.5 | 38.0 | 43.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 19 | 22 | 15 | 9 | 6 | 7 | 6 | 7 | 57.9 | 43.0 | 43.0 | 6 | 13 | 42.0 | 46.0 | 6 | 13 | 30.0 | 30.0 | 6 | 7 | 6 | 8 | 53.0 | 138 | 150 | 6 | 6.5 | 38.0 | 43.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 20 | 22 | 15 | 9 | 6 | 7 | 6 | 6 | 58.1 | 44.0 | 44.0 | 6 | 14 | 42.0 | 45.0 | 6 | 14 | 30.0 | 30.0 | 6 | 7 | 6 | 7.5 | 52.9 | 138 | 150 | 6 | 6.5 | 38.0 | 43.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 20 | 23 | 16 | 9 | 6 | 6.5 | 6 | 7 | 58.5 | 44.0 | 44.0 | 6 | 13 | 42.0 | 45.0 | 6 | 13 | 30.0 | 30.0 | 6 | 7 | 6 | 7.5 | 53.3 | 139 | 151 | 6 | 6.5 | 38.0 | 44.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 21 | 23 | 16 | 9 | 6 | 6.5 | 6 | 6.5 | 58.9 | 45.0 | 45.0 | 6 | 13 | 42.0 | 45.0 | 6 | 13 | 29.0 | 30.0 | 6 | 6.5 | 6 | 7.5 | 53.3 | 139 | 151 | 6 | 6 | 38.0 | 44.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |




GENERAL NOTES:
IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 8 FEET
HEIGHT (HT): 10 THRU 11 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
11 OF 27

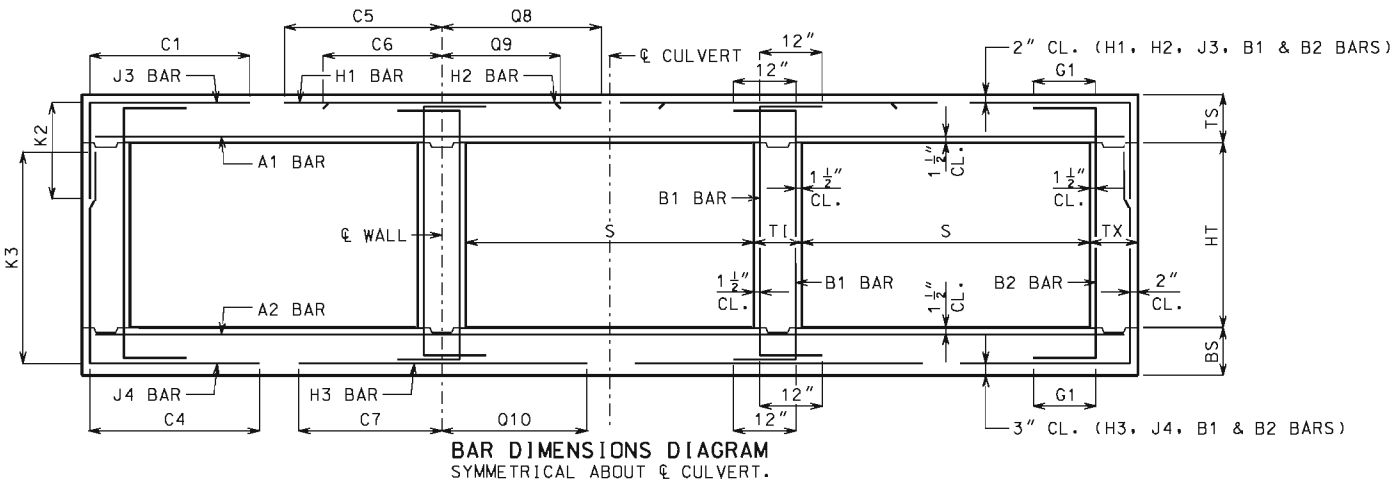
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|-------|-------|---------|------|---------|------|------------------------------------|------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 8 | 8 | 8 | 5 | 6.5 | 4 | 7.5 | 48.3 | 29.0 | 29.0 | 29.0 | 4 | 12 | 89.5 | 66.5 | 4 | 12 | 28.0 | 26.0 | 4 | 6.5 | 5 | 6 | 46.1 | 64 | 76 | 88 | 5 | 6 | 42.0 | 43.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 4 | 7.5 | 48.3 | 29.0 | 29.0 | 29.0 | 5 | 17 | 89.5 | 68.5 | 5 | 17 | 27.0 | 27.0 | 4 | 6.5 | 4 | 6 | 43.9 | 65 | 77 | 89 | 5 | 6.5 | 41.0 | 43.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 9 | 9 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 44.8 | 25.0 | 25.0 | 25.0 | 5 | 16 | 57.0 | 70.0 | 5 | 16 | 29.0 | 29.0 | 5 | 8.5 | 4 | 6 | 39.6 | 65 | 77 | 89 | 5 | 6 | 40.0 | 43.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 9 | 9 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 39.6 | 25.0 | 25.0 | 29.0 | 5 | 15 | 46.0 | 52.0 | 5 | 15 | 27.0 | 28.0 | 5 | 7.5 | 5 | 6.5 | 36.5 | 65 | 77 | 89 | 6 | 7 | 42.0 | 45.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 5 | 6.5 | 36.8 | 25.0 | 25.0 | 25.0 | 5 | 14 | 42.0 | 45.0 | 5 | 14 | 26.0 | 27.0 | 5 | 7.5 | 4 | 6.5 | 34.8 | 66 | 78 | 90 | 5 | 6 | 38.0 | 42.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 9 | 10 | 8 | 8 | 5 | 8.5 | 5 | 6 | 35.4 | 25.0 | 25.0 | 29.0 | 5 | 12 | 41.0 | 44.0 | 5 | 12 | 26.0 | 26.0 | 5 | 7 | 5 | 7 | 33.5 | 66 | 78 | 90 | 6 | 6.5 | 41.0 | 45.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 7 | 33.9 | 26.0 | 26.0 | 30.0 | 5 | 12 | 40.0 | 44.0 | 5 | 12 | 26.0 | 26.0 | 5 | 6.5 | 5 | 7.5 | 32.4 | 67 | 79 | 91 | 6 | 7 | 40.0 | 45.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 7.5 | 32.8 | 27.0 | 27.0 | 31.0 | 5 | 13 | 39.0 | 43.0 | 5 | 13 | 25.0 | 26.0 | 5 | 6 | 5 | 8.5 | 31.6 | 68 | 80 | 92 | 6 | 7 | 40.0 | 46.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 8 | 31.9 | 28.0 | 28.0 | 32.0 | 5 | 13 | 38.0 | 43.0 | 5 | 13 | 25.0 | 27.0 | 5 | 6 | 5 | 8.5 | 31.0 | 69 | 81 | 93 | 6 | 7 | 39.0 | 46.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 8 | 31.3 | 29.0 | 29.0 | 33.0 | 5 | 12 | 37.0 | 43.0 | 5 | 12 | 25.0 | 26.0 | 6 | 8 | 5 | 8.5 | 30.6 | 70 | 82 | 94 | 6 | 7.5 | 39.0 | 46.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8.5 | 30.6 | 30.0 | 30.0 | 34.0 | 5 | 12 | 37.0 | 43.0 | 5 | 12 | 24.0 | 26.0 | 6 | 8 | 5 | 8.5 | 30.3 | 71 | 83 | 95 | 6 | 7 | 39.0 | 46.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 8 | 35.3 | 31.0 | 31.0 | 35.0 | 6 | 16 | 45.0 | 52.0 | 6 | 16 | 32.0 | 34.0 | 6 | 7.5 | 5 | 8 | 30.0 | 72 | 84 | 96 | 6 | 7 | 39.0 | 46.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 7.5 | 35.0 | 31.0 | 35.0 | 35.0 | 6 | 16 | 45.0 | 52.0 | 6 | 16 | 33.0 | 35.0 | 6 | 6.5 | 5 | 8 | 29.8 | 72 | 84 | 96 | 6 | 6.5 | 39.0 | 46.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 7 | 34.9 | 32.0 | 36.0 | 36.0 | 6 | 15 | 45.0 | 52.0 | 6 | 15 | 32.0 | 34.0 | 6 | 7 | 5 | 7 | 29.8 | 73 | 85 | 97 | 6 | 6.5 | 39.0 | 46.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 34.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 45.0 | 52.0 | 6 | 14 | 32.0 | 34.0 | 6 | 7 | 5 | 6.5 | 29.8 | 74 | 86 | 98 | 6 | 6.5 | 39.0 | 46.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 18 | 19 | 8 | 8 | 6 | 7 | 5 | 6.5 | 33.6 | 38.0 | 38.0 | 38.0 | 6 | 13 | 44.0 | 52.0 | 6 | 13 | 31.0 | 32.0 | 6 | 7 | 5 | 6.5 | 28.8 | 75 | 87 | 99 | 6 | 6 | 39.0 | 46.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 18 | 20 | 8 | 8 | 6 | 7 | 5 | 6.5 | 33.8 | 38.0 | 38.0 | 38.0 | 6 | 13 | 44.0 | 51.0 | 6 | 13 | 32.0 | 33.0 | 6 | 7 | 5 | 6 | 28.8 | 76 | 88 | 100 | 6 | 6.5 | 39.0 | 46.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 19 | 20 | 8 | 8 | 6 | 6.5 | 5 | 6 | 33.6 | 39.0 | 39.0 | 39.0 | 6 | 13 | 44.0 | 51.0 | 6 | 13 | 31.0 | 33.0 | 6 | 6 | 5 | 6 | 28.9 | 76 | 88 | 100 | 6 | 6 | 39.0 | 46.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 20 | 21 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 37.8 | 44.0 | 44.0 | 44.0 | 6 | 12 | 44.0 | 51.0 | 6 | 12 | 30.0 | 32.0 | 6 | 6.5 | 6 | 7.5 | 32.0 | 77 | 89 | 101 | 6 | 6 | 39.0 | 46.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 20 | 22 | 8 | 8 | 6 | 6 | 6 | 7.5 | 37.9 | 44.0 | 44.0 | 44.0 | 6 | 12 | 44.0 | 51.0 | 6 | 12 | 31.0 | 32.0 | 6 | 6.5 | 6 | 7 | 32.0 | 78 | 90 | 102 | 6 | 6 | 39.0 | 46.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 21 | 23 | 8 | 8 | 6 | 6 | 6 | 7 | 38.0 | 45.0 | 45.0 | 45.0 | 6 | 12 | 44.0 | 51.0 | 6 | 12 | 30.0 | 32.0 | 6 | 6.5 | 6 | 6.5 | 32.3 | 79 | 91 | 103 | 6 | 6 | 39.0 | 46.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 22 | 23 | 8 | 8 | 6 | 6 | 6 | 6.5 | 37.9 | 46.0 | 46.0 | 46.0 | 6 | 12 | 44.0 | 51.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6 | 6 | 6.5 | 32.3 | 79 | 91 | 103 | 7 | 8 | 42.0 | 49.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 23 | 24 | 9 | 8 | 6 | 6 | 6 | 7 | 38.8 | 47.0 | 47.0 | 47.0 | 6 | 12 | 44.0 | 50.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6 | 6 | 7 | 33.0 | 80 | 92 | 104 | 7 | 8 | 42.0 | 50.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 23 | 25 | 9 | 8 | 7 | 8 | 6 | 7 | 38.9 | 47.0 | 47.0 | 47.0 | 7 | 16 | 49.0 | 55.0 | 7 | 16 | 35.0 | 36.0 | 6 | 6 | 6 | 7 | 33.0 | 81 | 93 | 105 | 7 | 8 | 42.0 | 50.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 24 | 25 | 9 | 8 | 7 | 8 | 6 | 7 | 38.9 | 48.0 | 48.0 | 48.0 | 6 | 12 | 43.0 | 50.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6 | 6 | 7 | 33.1 | 81 | 93 | 105 | 7 | 7.5 | 42.0 | 50.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 24 | 26 | 9 | 8 | 7 | 7.5 | 6 | 6.5 | 39.0 | 48.0 | 48.0 | 48.0 | 7 | 15 | 48.0 | 55.0 | 7 | 15 | 35.0 | 36.0 | 6 | 6 | 6 | 6.5 | 33.3 | 82 | 94 | 106 | 7 | 7.5 | 42.0 | 50.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|--------|---------|------|------|------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|--------|---------|------|------|-------------------------------------|---------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 48.3 | 29.0 | 29.0 | 33.0 | 4 | 12 | 89.5 | 66.5 | 4 | 12 | 29.0 | 27.0 | 4 | 6.5 | 6 | 6.5 | 75.0 | 101 | 113 | 125 | 5 | 7 | 43.0 | 44.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 51.3 | 29.0 | 33.0 | 33.0 | 5 | 18 | 91.5 | 68.5 | 5 | 18 | 28.0 | 25.0 | 5 | 9 | 6 | 6.5 | 69.0 | 101 | 113 | 125 | 5 | 6.5 | 42.0 | 44.0 | 5 | 12 | 5 | 11.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 9 | 9 | 8 | 8 | 5 | 8.5 | 6 | 7 | 51.3 | 29.0 | 33.0 | 33.0 | 5 | 16 | 91.5 | 70.0 | 5 | 16 | 29.0 | 30.0 | 5 | 8 | 6 | 6 | 62.0 | 101 | 113 | 125 | 5 | 6 | 41.0 | 44.0 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 9 | 10 | 9 | 8 | 5 | 8.5 | 5 | 6 | 54.9 | 25.0 | 25.0 | 29.0 | 5 | 15 | 49.0 | 53.0 | 5 | 15 | 27.0 | 28.0 | 5 | 8 | 5 | 6 | 53.9 | 102 | 114 | 126 | 5 | 6.5 | 39.0 | 43.0 | 5 | 12 | 5 | 11 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 9 | 10 | 9 | 8 | 5 | 8.5 | 5 | 6 | 48.8 | 25.0 | 29.0 | 29.0 | 5 | 14 | 44.0 | 46.0 | 5 | 14 | 26.0 | 27.0 | 5 | 7 | 6 | 6.5 | 52.4 | 102 | 114 | 126 | 6 | 7 | 41.0 | 46.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 9 | 11 | 9 | 8 | 5 | 8.5 | 5 | 6 | 46.5 | 25.0 | 29.0 | 29.0 | 5 | 12 | 42.0 | 44.0 | 5 | 12 | 26.0 | 26.0 | 5 | 6.5 | 6 | 7 | 51.4 | 103 | 115 | 127 | 5 | 6 | 38.0 | 43.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 10 | 11 | 9 | 8 | 5 | 8 | 5 | 6 | 45.8 | 30.0 | 30.0 | 30.0 | 5 | 13 | 40.0 | 43.0 | 5 | 13 | 26.0 | 27.0 | 5 | 6.5 | 6 | 6 | 49.5 | 103 | 115 | 127 | 6 | 7 | 40.0 | 45.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 11 | 12 | 9 | 8 | 5 | 7.5 | 6 | 7 | 48.1 | 31.0 | 31.0 | 35.0 | 5 | 13 | 39.0 | 43.0 | 5 | 13 | 25.0 | 27.0 | 5 | 6 | 6 | 6.5 | 48.8 | 104 | 116 | 128 | 6 | 7 | 40.0 | 46.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 12 | 13 | 9 | 8 | 5 | 7 | 6 | 6.5 | 47.4 | 32.0 | 32.0 | 36.0 | 5 | 13 | 39.0 | 43.0 | 5 | 13 | 25.0 | 27.0 | 5 | 6 | 6 | 6.5 | 48.3 | 105 | 117 | 129 | 6 | 7 | 40.0 | 46.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 13 | 14 | 9 | 8 | 5 | 6.5 | 6 | 7 | 46.9 | 33.0 | 33.0 | 37.0 | 5 | 12 | 38.0 | 43.0 | 5 | 12 | 24.0 | 26.0 | 6 | 8 | 6 | 6.5 | 47.6 | 106 | 118 | 130 | 6 | 7.5 | 40.0 | 46.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 13 | 15 | 9 | 8 | 5 | 6.5 | 6 | 6 | 46.0 | 33.0 | 33.0 | 37.0 | 5 | 12 | 38.0 | 43.0 | 5 | 12 | 25.0 | 27.0 | 6 | 8 | 6 | 6.5 | 47.1 | 107 | 119 | 131 | 6 | 7 | 40.0 | 46.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 14 | 16 | 11 | 8 | 5 | 6 | 5 | 6 | 43.5 | 34.0 | 34.0 | 34.0 | 5 | 12 | 37.0 | 42.0 | 5 | 12 | 25.0 | 26.0 | 6 | 7.5 | 5 | 7 | 44.0 | 108 | 120 | 132 | 6 | 7 | 40.0 | 46.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 15 | 17 | 11 | 8 | 6 | 8 | 5 | 6 | 48.4 | 35.0 | 35.0 | 35.0 | 6 | 16 | 46.0 | 51.0 | 6 | 16 | 33.0 | 35.0 | 6 | 7.5 | 5 | 7 | 44.0 | 109 | 121 | 133 | 6 | 6.5 | 40.0 | 46.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 16 | 17 | 11 | 8 | 6 | 8 | 6 | 8 | 52.1 | 36.0 | 36.0 | 36.0 | 6 | 15 | 45.0 | 51.0 | 6 | 15 | 32.0 | 34.0 | 6 | 6.5 | 5 | 6 | 43.6 | 109 | 121 | 133 | 6 | 6.5 | 40.0 | 46.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 17 | 18 | 12 | 8 | 6 | 7.5 | 5 | 6 | 48.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 45.0 | 51.0 | 6 | 14 | 31.0 | 33.0 | 6 | 7 | 5 | 6.5 | 43.9 | 110 | 122 | 134 | 6 | 6.5 | 40.0 | 46.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 17 | 19 | 12 | 8 | 6 | 7.5 | 5 | 6 | 46.9 | 37.0 | 37.0 | 37.0 | 6 | 14 | 44.0 | 51.0 | 6 | 14 | 32.0 | 33.0 | 6 | 7 | 5 | 6.5 | 42.0 | 111 | 123 | 135 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 18 | 20 | 12 | 8 | 6 | 7 | 6 | 8 | 51.0 | 38.0 | 38.0 | 38.0 | 6 | 13 | 44.0 | 50.0 | 6 | 13 | 31.0 | 33.0 | 6 | 7 | 5 | 6.5 | 42.3 | 112 | 124 | 136 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 19 | 20 | 12 | 8 | 6 | 7 | 6 | 8 | 50.9 | 39.0 | 39.0 | 39.0 | 6 | 13 | 44.0 | 50.0 | 6 | 13 | 30.0 | 32.0 | 6 | 6 | 5 | 6.5 | 42.3 | 112 | 124 | 136 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 19 | 21 | 13 | 8 | 6 | 6.5 | 6 | 8 | 51.6 | 39.0 | 39.0 | 39.0 | 6 | 13 | 44.0 | 50.0 | 6 | 13 | 31.0 | 32.0 | 6 | 6.5 | 5 | 6 | 42.5 | 113 | 125 | 137 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 20 | 22 | 13 | 8 | 6 | 6.5 | 6 | 7.5 | 51.8 | 40.0 | 40.0 | 40.0 | 6 | 12 | 44.0 | 50.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6.5 | 5 | 6 | 42.8 | 114 | 126 | 138 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 21 | 23 | 13 | 8 | 6 | 6.5 | 6 | 7.5 | 51.9 | 41.0 | 41.0 | 41.0 | 6 | 12 | 44.0 | 49.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6.5 | 5 | 6 | 43.0 | 115 | 127 | 139 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 21 | 24 | 14 | 8 | 6 | 6 | 6 | 7.5 | 52.6 | 41.0 | 41.0 | 41.0 | 6 | 12 | 44.0 | 49.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6.5 | 5 | 6 | 43.4 | 116 | 128 | 140 | 6 | 6 | 40.0 | 47.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 22 | 24 | 14 | 8 | 6 | 6 | 6 | 7.5 | 52.6 | 42.0 | 42.0 | 42.0 | 6 | 12 | 44.0 | 49.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6 | 5 | 6 | 43.4 | 116 | 128 | 140 | 7 | 7.5 | 43.0 | 50.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 23 | 25 | 14 | 8 | 6 | 6 | 6 | 7 | 52.8 | 43.0 | 43.0 | 43.0 | 6 | 12 | 43.0 | 48.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6 | 5 | 6 | 43.6 | 117 | 129 | 141 | 7 | 7.5 | 43.0 | 50.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 23 | 26 | 15 | 8 | 6 | 6 | 6 | 7 | 53.6 | 43.0 | 43.0 | 47.0 | 6 | 12 | 44.0 | 48.0 | 6 | 12 | 30.0 | 31.0 | 6 | 6 | 6 | 8 | 47.0 | 118 | 130 | 142 | 7 | 7.5 | 43.0 | 50.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 24 | 26 | 15 | 8 | 6 | 6 | 6 | 7 | 53.6 | 44.0 | 44.0 | 48.0 | 6 | 12 | 43.0 | 48.0 | 6 | 12 | 30.0 | 30.0 | 6 | 6 | 6 | 8 | 47.1 | 118 | 130 | 142 | 7 | 7.5 | 43.0 | 50.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT | | | | | | | | | | | | | | |
|-----------------|------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|------|------|---------|------|------|------|---------|------|------------------|----|--------|--------|---------|------|----|-----|---------|------|---------|------|------------------------------|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | | | | | | | | | | | | HT=11' | HT=12' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 9 | 10 | 5 | 6.5 | 5 | 7.5 | 49.3 | 33.0 | 33.0 | 4 | 12 | 90.5 | 67.5 | 4 | 12 | 29.0 | 27.0 | 4 | 6 | 6 | 6 | 76.3 | 137 | 149 | 5 | 6.5 | 44.0 | 44.0 | 5 | 10 | 5 | 9 | 12 | | | | | | | | | | | | |
| 2 FT | 13 | 10 | 9 | 10 | 5 | 6.5 | 5 | 7 | 52.3 | 33.0 | 33.0 | 5 | 18 | 92.5 | 69.5 | 5 | 18 | 28.0 | 25.0 | 4 | 6 | 6 | 6.5 | 76.3 | 138 | 150 | 5 | 7 | 44.0 | 45.0 | 5 | 11.5 | 5 | 9 | 12 | | | | | | | | | | | | |
| 4 FT | 9 | 10 | 9 | 10 | 5 | 8.5 | 5 | 6 | 52.3 | 29.0 | 29.0 | 5 | 16 | 92.5 | 71.0 | 5 | 16 | 29.0 | 30.0 | 5 | 8.5 | 6 | 6 | 76.3 | 138 | 150 | 5 | 7 | 43.0 | 45.0 | 5 | 11.5 | 5 | 8.5 | 12 | | | | | | | | | | | | |
| 6 FT | 9 | 10 | 10 | 10 | 5 | 8.5 | 5 | 6 | 69.4 | 29.0 | 29.0 | 5 | 16 | 51.0 | 49.0 | 5 | 16 | 28.0 | 28.0 | 5 | 7.5 | 6 | 6.5 | 68.8 | 138 | 150 | 5 | 6 | 41.0 | 43.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | |
| 8 FT | 9 | 10 | 10 | 10 | 5 | 8.5 | 5 | 6 | 60.0 | 29.0 | 29.0 | 5 | 14 | 45.0 | 45.0 | 5 | 14 | 27.0 | 27.0 | 5 | 7 | 6 | 6 | 63.9 | 138 | 150 | 6 | 7 | 43.0 | 45.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 10 FT | 9 | 11 | 10 | 10 | 5 | 8.5 | 6 | 7 | 59.0 | 29.0 | 33.0 | 5 | 13 | 42.0 | 43.0 | 5 | 13 | 27.0 | 27.0 | 5 | 6.5 | 6 | 6 | 63.6 | 139 | 151 | 5 | 6 | 39.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 12 FT | 10 | 12 | 10 | 10 | 5 | 8 | 6 | 7 | 58.6 | 30.0 | 34.0 | 5 | 13 | 41.0 | 43.0 | 5 | 13 | 26.0 | 27.0 | 5 | 6.5 | 6 | 6.5 | 62.8 | 140 | 152 | 5 | 6 | 39.0 | 43.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 14 FT | 11 | 12 | 10 | 10 | 5 | 7.5 | 6 | 7.5 | 58.5 | 31.0 | 35.0 | 5 | 13 | 41.0 | 43.0 | 5 | 13 | 26.0 | 27.0 | 5 | 6 | 6 | 6 | 60.4 | 140 | 152 | 6 | 7 | 41.0 | 45.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 16 FT | 12 | 13 | 11 | 10 | 5 | 7 | 5 | 6 | 54.4 | 32.0 | 32.0 | 5 | 13 | 40.0 | 42.0 | 5 | 13 | 26.0 | 27.0 | 5 | 6 | 6 | 7 | 59.1 | 141 | 153 | 6 | 7 | 41.0 | 45.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 18 FT | 12 | 14 | 11 | 10 | 5 | 7 | 6 | 7.5 | 55.6 | 32.0 | 36.0 | 5 | 12 | 39.0 | 42.0 | 5 | 12 | 26.0 | 27.0 | 6 | 8 | 6 | 6.5 | 59.0 | 142 | 154 | 6 | 7.5 | 41.0 | 46.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 20 FT | 13 | 15 | 12 | 10 | 5 | 6.5 | 6 | 8 | 55.0 | 33.0 | 37.0 | 5 | 12 | 38.0 | 42.0 | 5 | 12 | 26.0 | 27.0 | 6 | 8 | 6 | 7 | 58.1 | 143 | 155 | 6 | 7 | 41.0 | 46.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 22 FT | 14 | 16 | 12 | 10 | 5 | 6 | 6 | 7.5 | 55.0 | 34.0 | 38.0 | 5 | 12 | 38.0 | 42.0 | 5 | 12 | 25.0 | 27.0 | 6 | 7.5 | 6 | 7 | 57.9 | 144 | 156 | 6 | 7 | 41.0 | 46.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 24 FT | 15 | 17 | 13 | 10 | 6 | 8 | 6 | 7.5 | 61.0 | 35.0 | 39.0 | 6 | 16 | 47.0 | 51.0 | 6 | 16 | 33.0 | 35.0 | 6 | 7.5 | 6 | 7.5 | 57.4 | 145 | 157 | 6 | 6.5 | 41.0 | 46.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 26 FT | 16 | 17 | 13 | 10 | 6 | 8 | 6 | 7 | 61.3 | 40.0 | 40.0 | 6 | 15 | 46.0 | 51.0 | 6 | 15 | 33.0 | 34.0 | 6 | 6.5 | 6 | 7 | 56.6 | 145 | 157 | 6 | 6.5 | 41.0 | 46.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 28 FT | 16 | 18 | 14 | 10 | 6 | 8 | 6 | 7.5 | 61.0 | 36.0 | 40.0 | 6 | 15 | 46.0 | 51.0 | 6 | 15 | 33.0 | 35.0 | 6 | 7 | 6 | 7 | 56.6 | 146 | 158 | 6 | 6.5 | 41.0 | 46.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 30 FT | 17 | 19 | 14 | 10 | 6 | 7.5 | 6 | 7.5 | 59.6 | 37.0 | 41.0 | 6 | 14 | 45.0 | 50.0 | 6 | 14 | 32.0 | 34.0 | 6 | 7 | 6 | 7.5 | 54.8 | 147 | 159 | 6 | 6 | 41.0 | 46.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 32 FT | 18 | 20 | 14 | 10 | 6 | 7 | 6 | 7 | 59.9 | 38.0 | 42.0 | 6 | 13 | 45.0 | 50.0 | 6 | 13 | 32.0 | 33.0 | 6 | 7 | 6 | 7.5 | 55.0 | 148 | 160 | 6 | 6 | 41.0 | 46.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 34 FT | 18 | 20 | 14 | 10 | 6 | 6.5 | 6 | 6.5 | 59.8 | 38.0 | 42.0 | 6 | 13 | 45.0 | 50.0 | 6 | 13 | 32.0 | 34.0 | 6 | 6 | 6 | 7.5 | 54.9 | 148 | 160 | 6 | 6 | 41.0 | 46.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 36 FT | 19 | 21 | 15 | 10 | 6 | 6.5 | 6 | 7 | 60.3 | 43.0 | 43.0 | 6 | 13 | 45.0 | 50.0 | 6 | 13 | 31.0 | 33.0 | 6 | 6.5 | 6 | 7.5 | 55.3 | 149 | 161 | 6 | 6 | 41.0 | 47.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 38 FT | 20 | 22 | 15 | 10 | 6 | 6.5 | 6 | 6.5 | 60.6 | 44.0 | 44.0 | 6 | 12 | 45.0 | 50.0 | 6 | 12 | 31.0 | 32.0 | 6 | 6.5 | 6 | 7.5 | 55.5 | 150 | 162 | 6 | 6 | 41.0 | 47.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 40 FT | 20 | 23 | 16 | 10 | 6 | 6.5 | 6 | 6.5 | 60.9 | 44.0 | 44.0 | 6 | 12 | 45.0 | 49.0 | 6 | 12 | 31.0 | 32.0 | 6 | 6.5 | 6 | 7.5 | 55.9 | 151 | 163 | 6 | 6 | 41.0 | 47.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 42 FT | 21 | 23 | 16 | 10 | 6 | 6.5 | 6 | 6.5 | 61.1 | 45.0 | 45.0 | 6 | 12 | 45.0 | 49.0 | 6 | 12 | 31.0 | 32.0 | 6 | 6 | 6 | 7.5 | 55.8 | 151 | 163 | 7 | 7.5 | 44.0 | 50.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 44 FT | 22 | 24 | 17 | 10 | 6 | 6 | 6 | 6.5 | 61.9 | 46.0 | 46.0 | 6 | 12 | 45.0 | 49.0 | 6 | 12 | 31.0 | 32.0 | 6 | 6 | 6 | 7 | 56.3 | 152 | 164 | 7 | 7.5 | 44.0 | 50.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | |
| 46 FT | 22 | 25 | 17 | 10 | 6 | 6 | 6 | 6 | 61.9 | 46.0 | 46.0 | 6 | 12 | 45.0 | 48.0 | 6 | 12 | 31.0 | 32.0 | 6 | 6 | 6 | 7 | 56.5 | 153 | 165 | 7 | 8 | 44.0 | 50.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | |
| 48 FT | 23 | 26 | 18 | 10 | 6 | 6 | 6 | 6.5 | 62.5 | 47.0 | 47.0 | 6 | 12 | 44.0 | 48.0 | 6 | 12 | 31.0 | 31.0 | 6 | 6 | 6 | 6.5 | 57.0 | 154 | 166 | 7 | 8 | 44.0 | 50.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | |
| 50 FT | 23 | 26 | 18 | 10 | 7 | 8 | 6 | 6 | 62.5 | 47.0 | 47.0 | 6 | 12 | 44.0 | 48.0 | 6 | 12 | 31.0 | 31.0 | 6 | 6 | 6 | 6.5 | 56.9 | 154 | 166 | 7 | 7.5 | 44.0 | 50.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 9 FEET
HEIGHT (HT): 11 THRU 12 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
13 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 5 FT OR 6 FT OR 7 FT | | | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|-------|-------|---------|------|---------|------------------------------------|-----------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | HT=5' | HT=6' | HT=7' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 4 | 7 | 51.9 | 29.0 | 29.0 | 29.0 | 5 | 16 | 98.5 | 74.5 | 5 | 16 | 29.0 | 27.0 | 4 | 6 | 4 | 6 | 47.4 | 65 | 77 | 89 | 5 | 6.5 | 45.0 | 47.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 2 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 4 | 6.5 | 51.9 | 29.0 | 29.0 | 29.0 | 5 | 14 | 98.5 | 74.5 | 5 | 14 | 28.0 | 29.0 | 5 | 8.5 | 5 | 6.5 | 43.3 | 65 | 77 | 89 | 5 | 6 | 44.0 | 46.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 4 FT | 9 | 9 | 8 | 8 | 5 | 7.5 | 6 | 7.5 | 48.4 | 25.0 | 29.0 | 29.0 | 5 | 13 | 59.0 | 76.0 | 5 | 13 | 30.0 | 30.0 | 5 | 7.5 | 5 | 6.5 | 39.0 | 65 | 77 | 89 | 6 | 6.5 | 46.0 | 49.0 | 5 | 10 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 6 FT | 9 | 9 | 8 | 8 | 5 | 8 | 5 | 6 | 39.8 | 29.0 | 29.0 | 29.0 | 5 | 13 | 49.0 | 55.0 | 5 | 13 | 28.0 | 29.0 | 5 | 7.5 | 6 | 7 | 39.8 | 65 | 77 | 89 | 6 | 6 | 45.0 | 48.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 8 FT | 10 | 10 | 8 | 8 | 5 | 8 | 5 | 7.5 | 36.8 | 26.0 | 26.0 | 30.0 | 5 | 13 | 45.0 | 50.0 | 5 | 13 | 28.0 | 28.0 | 5 | 7 | 5 | 6.5 | 34.8 | 66 | 78 | 90 | 6 | 6.5 | 44.0 | 48.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 10 FT | 10 | 11 | 8 | 8 | 5 | 8 | 5 | 6.5 | 35.4 | 26.0 | 26.0 | 30.0 | 6 | 15 | 47.0 | 51.0 | 6 | 15 | 30.0 | 31.0 | 5 | 6.5 | 5 | 7.5 | 32.9 | 67 | 79 | 91 | 6 | 6.5 | 43.0 | 49.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 12 FT | 11 | 12 | 8 | 8 | 5 | 7.5 | 5 | 7 | 33.6 | 27.0 | 27.0 | 31.0 | 6 | 16 | 45.0 | 50.0 | 6 | 16 | 30.0 | 31.0 | 5 | 6 | 5 | 8.5 | 31.6 | 68 | 80 | 92 | 6 | 6.5 | 42.0 | 49.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 14 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 8 | 32.4 | 28.0 | 28.0 | 32.0 | 6 | 16 | 44.0 | 50.0 | 6 | 16 | 29.0 | 31.0 | 5 | 6 | 5 | 8.5 | 30.9 | 69 | 81 | 93 | 6 | 6.5 | 42.0 | 49.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 16 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 8 | 31.3 | 29.0 | 29.0 | 33.0 | 6 | 16 | 44.0 | 50.0 | 6 | 16 | 29.0 | 31.0 | 6 | 8 | 5 | 8.5 | 30.3 | 70 | 82 | 94 | 6 | 7 | 42.0 | 49.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 18 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 8.5 | 30.5 | 30.0 | 30.0 | 34.0 | 6 | 16 | 43.0 | 50.0 | 6 | 16 | 29.0 | 31.0 | 6 | 7.5 | 5 | 8.5 | 29.8 | 71 | 83 | 95 | 6 | 7 | 41.0 | 49.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 20 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 8 | 34.9 | 31.0 | 31.0 | 35.0 | 6 | 16 | 48.0 | 56.0 | 6 | 16 | 35.0 | 37.0 | 6 | 7 | 5 | 8 | 29.4 | 72 | 84 | 96 | 6 | 7 | 41.0 | 49.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 22 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 7 | 34.4 | 32.0 | 32.0 | 36.0 | 6 | 15 | 48.0 | 56.0 | 6 | 15 | 34.0 | 37.0 | 6 | 7 | 5 | 7 | 29.0 | 73 | 85 | 97 | 6 | 6.5 | 41.0 | 50.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 24 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 34.0 | 37.0 | 37.0 | 37.0 | 6 | 14 | 48.0 | 56.0 | 6 | 14 | 34.0 | 36.0 | 6 | 6.5 | 5 | 6.5 | 28.9 | 74 | 86 | 98 | 6 | 6.5 | 41.0 | 50.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | |
| 26 FT | 18 | 19 | 8 | 8 | 6 | 7 | 5 | 6.5 | 33.9 | 38.0 | 38.0 | 38.0 | 6 | 13 | 47.0 | 55.0 | 6 | 13 | 33.0 | 35.0 | 6 | 6.5 | 5 | 6.5 | 28.8 | 75 | 87 | 99 | 6 | 6 | 41.0 | 50.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | |
| 28 FT | 19 | 20 | 8 | 8 | 6 | 6.5 | 5 | 6 | 33.8 | 39.0 | 39.0 | 39.0 | 6 | 13 | 47.0 | 55.0 | 6 | 13 | 33.0 | 35.0 | 6 | 6.5 | 5 | 6 | 28.8 | 76 | 88 | 100 | 6 | 6 | 41.0 | 50.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 30 FT | 19 | 21 | 8 | 8 | 6 | 6 | 5 | 6 | 33.8 | 39.0 | 39.0 | 39.0 | 6 | 12 | 47.0 | 55.0 | 6 | 12 | 33.0 | 36.0 | 6 | 6 | 6 | 7.5 | 31.6 | 77 | 89 | 101 | 7 | 7.5 | 44.0 | 53.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 32 FT | 20 | 22 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 37.8 | 44.0 | 44.0 | 44.0 | 6 | 12 | 47.0 | 55.0 | 6 | 12 | 33.0 | 35.0 | 6 | 6 | 6 | 7 | 31.8 | 78 | 90 | 102 | 7 | 7.5 | 44.0 | 53.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 34 FT | 21 | 23 | 8 | 8 | 6 | 6 | 6 | 7 | 36.8 | 45.0 | 45.0 | 45.0 | 6 | 12 | 46.0 | 55.0 | 6 | 12 | 32.0 | 34.0 | 6 | 6 | 6 | 6.5 | 30.9 | 79 | 91 | 103 | 7 | 7.5 | 44.0 | 53.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 36 FT | 22 | 23 | 8 | 8 | 6 | 6 | 6 | 6.5 | 36.8 | 46.0 | 46.0 | 46.0 | 7 | 15 | 51.0 | 60.0 | 7 | 15 | 36.0 | 38.0 | 6 | 6 | 6 | 6.5 | 31.0 | 79 | 91 | 103 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 38 FT | 23 | 24 | 8 | 8 | 7 | 7.5 | 6 | 6 | 36.8 | 47.0 | 47.0 | 47.0 | 7 | 15 | 51.0 | 59.0 | 7 | 15 | 36.0 | 37.0 | 6 | 6 | 6 | 6 | 31.1 | 80 | 92 | 104 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | |
| 40 FT | 23 | 25 | 8 | 8 | 7 | 7.5 | 6 | 6 | 36.9 | 47.0 | 47.0 | 47.0 | 7 | 15 | 51.0 | 59.0 | 7 | 15 | 36.0 | 38.0 | 6 | 6 | 6 | 6 | 31.1 | 81 | 93 | 105 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 42 FT | 24 | 26 | 8 | 8 | 7 | 7.5 | 6 | 6 | 37.0 | 48.0 | 48.0 | 48.0 | 7 | 14 | 51.0 | 59.0 | 7 | 14 | 36.0 | 37.0 | 7 | 8 | 7 | 6.5 | 34.4 | 82 | 94 | 106 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 44 FT | 25 | 26 | 9 | 8 | 7 | 7 | 6 | 6.5 | 37.8 | 49.0 | 49.0 | 49.0 | 7 | 14 | 51.0 | 59.0 | 7 | 14 | 36.0 | 37.0 | 7 | 7.5 | 6 | 6.5 | 32.0 | 82 | 94 | 106 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | |
| 46 FT | 25 | 27 | 9 | 8 | 7 | 7 | 6 | 6.5 | 37.9 | 49.0 | 49.0 | 49.0 | 7 | 14 | 51.0 | 59.0 | 7 | 14 | 36.0 | 37.0 | 7 | 7.5 | 6 | 6.5 | 32.0 | 83 | 95 | 107 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 48 FT | 26 | 28 | 9 | 8 | 7 | 7 | 6 | 6.5 | 38.0 | 50.0 | 50.0 | 50.0 | 7 | 14 | 51.0 | 58.0 | 7 | 14 | 35.0 | 37.0 | 7 | 7.5 | 6 | 6 | 32.3 | 84 | 96 | 108 | 7 | 7 | 44.0 | 53.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 50 FT | 27 | 28 | 9 | 8 | 7 | 7 | 6 | 6 | 38.0 | 51.0 | 51.0 | 51.0 | 7 | 14 | 51.0 | 58.0 | 7 | 14 | 35.0 | 37.0 | 7 | 7 | 6 | 6 | 32.4 | 84 | 96 | 108 | 7 | 6.5 | 44.0 | 53.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | |

| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|-------|---------|------|------|-------|---------|------|------|------|---------|------------------|---------|------|------|------|---------|-------|--------|------|---------|------|---------|-------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 5 | 8.5 | 54.9 | 29.0 | 33.0 | 33.0 | 5 | 16 | 100.5 | 74.5 | 5 | 16 | 30.0 | 30.0 | 5 | 8.5 | 6 | 6.5 | 74.1 | 101 | 113 | 125 | 5 | 6 | 46.0 | 47.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | |
| 2 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 5 | 8 | 54.9 | 29.0 | 33.0 | 33.0 | 5 | 14 | 100.5 | 74.5 | 5 | 14 | 28.0 | 28.0 | 5 | 7.5 | 6 | 6 | 65.8 | 101 | 113 | 125 | 6 | 7 | 47.0 | 50.0 | 5 | 12 | 5 | 11.5 | 12 | | | | | | | | | | | | | |
| 4 FT | 9 | 9 | 9 | 8 | 5 | 7 | 5 | 6 | 65.9 | 29.0 | 29.0 | 29.0 | 5 | 13 | 74.0 | 76.0 | 5 | 13 | 30.0 | 31.0 | 5 | 7.5 | 6 | 6.5 | 57.6 | 101 | 113 | 125 | 6 | 6.5 | 46.0 | 50.0 | 5 | 12 | 5 | 11.5 | 12 | | | | | | | | | | | | | |
| 6 FT | 9 | 9 | 9 | 8 | 5 | 8 | 5 | 6 | 51.8 | 29.0 | 29.0 | 29.0 | 5 | 13 | 51.0 | 57.0 | 5 | 13 | 29.0 | 29.0 | 5 | 7 | 6 | 6 | 52.9 | 101 | 113 | 125 | 6 | 6 | 45.0 | 48.0 | 5 | 12 | 5 | 11.5 | 12 | | | | | | | | | | | | | |
| 8 FT | 9 | 10 | 9 | 8 | 5 | 8 | 5 | 6 | 48.1 | 29.0 | 29.0 | 29.0 | 6 | 15 | 49.0 | 52.0 | 6 | 15 | 30.0 | 31.0 | 5 | 7 | 6 | 6.5 | 51.0 | 102 | 114 | 126 | 6 | 6 | 44.0 | 49.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | |
| 10 FT | 10 | 11 | 9 | 8 | 5 | 8 | 5 | 6 | 46.5 | 30.0 | 30.0 | 30.0 | 5 | 12 | 44.0 | 48.0 | 5 | 12 | 27.0 | 28.0 | 5 | 6.5 | 6 | 6.5 | 49.5 | 103 | 115 | 127 | 6 | 6.5 | 43.0 | 49.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | |
| 12 FT | 11 | 12 | 9 | 8 | 5 | 7.5 | 6 | 7 | 48.1 | 31.0 | 31.0 | 35.0 | 6 | 16 | 45.0 | 50.0 | 6 | 16 | 30.0 | 31.0 | 5 | 6 | 6 | 6.5 | 48.4 | 104 | 116 | 128 | 6 | 6.5 | 43.0 | 49.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | |
| 14 FT | 12 | 13 | 9 | 8 | 5 | 7 | 6 | 7 | 47.0 | 32.0 | 32.0 | 36.0 | 6 | 16 | 45.0 | 50.0 | 6 | 16 | 29.0 | 31.0 | 5 | 6 | 6 | 7 | 47.4 | 105 | 117 | 129 | 6 | 6.5 | 42.0 | 49.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 16 FT | 13 | 14 | 9 | 8 | 5 | 6.5 | 6 | 7 | 46.0 | 33.0 | 33.0 | 37.0 | 6 | 16 | 44.0 | 50.0 | 6 | 16 | 29.0 | 31.0 | 6 | 8 | 6 | 7 | 46.5 | 106 | 118 | 130 | 6 | 7 | 42.0 | 49.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 18 FT | 14 | 15 | 9 | 8 | 5 | 6 | 6 | 7 | 45.3 | 34.0 | 34.0 | 38.0 | 6 | 16 | 43.0 | 49.0 | 6 | 16 | 29.0 | 31.0 | 6 | 7.5 | 6 | 7 | 45.9 | 107 | 119 | 131 | 6 | 7 | 42.0 | 49.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 20 FT | 15 | 16 | 9 | 8 | 6 | 8 | 6 | 7 | 50.5 | 35.0 | 35.0 | 39.0 | 6 | 16 | 49.0 | 55.0 | 6 | 16 | 35.0 | 37.0 | 6 | 7 | 6 | 6.5 | 45.3 | 108 | 120 | 132 | 6 | 7 | 42.0 | 49.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | |
| 22 FT | 15 | 17 | 11 | 8 | 6 | 7.5 | 5 | 6 | 47.1 | 35.0 | 35.0 | 35.0 | 6 | 15 | 48.0 | 55.0 | 6 | 15 | 35.0 | 37.0 | 6 | 7 | 5 | 7 | 42.1 | 109 | 121 | 133 | 6 | 6.5 | 42.0 | 50.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | |
| 24 FT | 17 | 18 | 11 | 8 | 6 | 7.5 | 6 | 8.5 | 50.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 48.0 | 55.0 | 6 | 14 | 33.0 | 36.0 | 6 | 6.5 | 5 | 6.5 | 42.0 | 110 | 122 | 134 | 6 | 6.5 | 42.0 | 50.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 26 FT | 18 | 19 | 11 | 8 | 6 | 7 | 6 | 8 | 50.4 | 38.0 | 38.0 | 38.0 | 6 | 13 | 47.0 | 55.0 | 6 | 13 | 33.0 | 35.0 | 6 | 6.5 | 5 | 6 | 41.8 | 111 | 123 | 135 | 6 | 6 | 42.0 | 50.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 28 FT | 18 | 20 | 12 | 8 | 6 | 7 | 6 | 8 | 51.0 | 38.0 | 38.0 | 38.0 | 6 | 13 | 47.0 | 54.0 | 6 | 13 | 34.0 | 36.0 | 6 | 6.5 | 5 | 6.5 | 41.9 | 112 | 124 | 136 | 6 | 6 | 42.0 | 50.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | |
| 30 FT | 19 | 21 | 12 | 8 | 6 | 6.5 | 6 | 7.5 | 50.9 | 39.0 | 39.0 | 39.0 | 6 | 13 | 47.0 | 54.0 | 6 | 13 | 33.0 | 35.0 | 6 | 6.5 | 5 | 6.5 | 41.9 | 113 | 125 | 137 | 7 | 7.5 | 45.0 | 53.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 32 FT | 20 | 22 | 12 | 8 | 6 | 6.5 | 6 | 7 | 50.9 | 40.0 | 40.0 | 40.0 | 6 | 12 | 47.0 | 54.0 | 6 | 12 | 32.0 | 34.0 | 6 | 6 | 5 | 6.5 | 42.0 | 114 | 126 | 138 | 7 | 7.5 | 45.0 | 53.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 34 FT | 21 | 23 | 12 | 8 | 6 | 6 | 6 | 7.5 | 49.6 | 41.0 | 41.0 | 41.0 | 6 | 12 | 46.0 | 53.0 | 6 | 12 | 31.0 | 33.0 | 6 | 6 | 5 | 6.5 | 40.8 | 115 | 127 | 139 | 7 | 7.5 | 45.0 | 53.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 36 FT | 22 | 24 | 12 | 8 | 6 | 6 | 6 | 7 | 49.8 | 42.0 | 42.0 | 42.0 | 7 | 15 | 51.0 | 58.0 | 7 | 15 | 36.0 | 37.0 | 6 | 6 | 5 | 6.5 | 40.9 | 116 | 128 | 140 | 7 | 7.5 | 45.0 | 53.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | |
| 38 FT | 22 | 24 | 13 | 8 | 6 | 6 | 6 | 7.5 | 50.4 | 42.0 | 42.0 | 42.0 | 7 | 15 | 51.0 | 58.0 | 7 | 15 | 36.0 | 38.0 | 6 | 6 | 5 | 6 | 41.1 | 116 | 128 | 140 | 7 | 7 | 45.0 | 53.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 40 FT | 23 | 25 | 13 | 8 | 7 | 7.5 | 6 | 7.5 | 50.4 | 43.0 | 43.0 | 43.0 | 7 | 15 | 51.0 | 58.0 | 7 | 15 | 36.0 | 37.0 | 6 | 6 | 5 | 6 | 41.4 | 117 | 129 | 141 | 7 | 7 | 45.0 | 53.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 42 FT | 24 | 26 | 13 | 8 | 7 | 7.5 | 6 | 6.5 | 50.5 | 44.0 | 44.0 | 44.0 | 7 | 15 | 51.0 | 57.0 | 7 | 15 | 35.0 | 36.0 | 7 | 8 | 5 | 6 | 41.5 | 118 | 130 | 142 | 7 | 7 | 45.0 | 53.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | |
| 44 FT | 24 | 27 | 14 | 8 | 7 | 7.5 | 6 | 7 | 51.3 | 44.0 | 44.0 | 44.0 | 7 | 14 | 51.0 | 57.0 | 7 | 14 | 36.0 | 37.0 | 7 | 8 | 5 | 6 | 41.9 | 119 | 131 | 143 | 7 | 7 | 45.0 | 54.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 46 FT | 25 | 27 | 14 | 8 | 7 | 7 | 6 | 7 | 51.3 | 45.0 | 45.0 | 45.0 | 7 | 14 | 51.0 | 57.0 | 7 | 14 | 35.0 | 36.0 | 7 | 7.5 | 5 | 6 | 42.0 | 119 | 131 | 143 | 7 | 6.5 | 45.0 | 53.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 48 FT | 26 | 28 | 14 | 8 | 7 | 7 | 6 | 7 | 51.4 | 46.0 | 46.0 | 46.0 | 7 | 15 | 51.0 | 56.0 | 7 | 15 | 35.0 | 36.0 | 7 | 7.5 | 5 | 6 | 42.1 | 120 | 132 | 144 | 7 | 6.5 | 45.0 | 53.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | |
| 50 FT | 26 | 29 | 15 | 8 | 7 | 7 | 6 | 7 | 52.1 | 50.0 | 50.0 | 50.0 | 7 | 14 | 51.0 | 56.0 | 7 | 14 | 35.0 | 36.0 | 7 | 7.5 | 6 | 8 | 45.5 | 121 | 133 | 145 | 7 | 6.5 | 45.0 | 54.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | |

| SPAN (S) = 10 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|--------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|--------|--------|--------|---------|------|---------|------|---------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 10 | 9 | 10 | 5 | 6.5 | 5 | 6.5 | 55.9 | 33.0 | 33.0 | 33.0 | 5 | 16 | 101.5 | 75.5 | 5 | 16 | 30.0 | 29.0 | 5 | 8.5 | 6 | 6 | 82.3 | 138 | 150 | 162 | 5 | 6.5 | 49.0 | 49.0 | 5 | 10 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 13 | 10 | 10 | 10 | 5 | 6.5 | 5 | 6.5 | 56.5 | 33.0 | 33.0 | 33.0 | 5 | 14 | 101.5 | 75.5 | 5 | 14 | 29.0 | 29.0 | 5 | 8 | 6 | 6.5 | 83.0 | 138 | 150 | 162 | 5 | 6.5 | 47.0 | 48.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 9 | 10 | 10 | 10 | 5 | 7 | 6 | 7 | 56.5 | 29.0 | 29.0 | 33.0 | 5 | 13 | 101.5 | 77.0 | 5 | 13 | 31.0 | 31.0 | 5 | 7 | 6 | 6 | 81.3 | 138 | 150 | 162 | 5 | 6 | 46.0 | 48.0 | 5 | 11 | 5 | 8 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 9 | 11 | 10 | 10 | 5 | 8 | 6 | 7 | 75.6 | 29.0 | 29.0 | 33.0 | 5 | 13 | 54.0 | 53.0 | 5 | 13 | 29.0 | 29.0 | 5 | 7 | 6 | 6 | 77.8 | 139 | 151 | 163 | 5 | 6 | 44.0 | 47.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 9 | 11 | 11 | 10 | 5 | 8 | 6 | 7 | 64.6 | 29.0 | 29.0 | 33.0 | 5 | 12 | 47.0 | 48.0 | 5 | 12 | 28.0 | 28.0 | 5 | 6.5 | 6 | 6.5 | 69.5 | 139 | 151 | 163 | 6 | 7 | 45.0 | 49.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 10 | 11 | 11 | 10 | 5 | 8 | 5 | 6 | 61.1 | 30.0 | 30.0 | 30.0 | 5 | 12 | 46.0 | 47.0 | 5 | 12 | 28.0 | 28.0 | 5 | 6 | 6 | 6 | 65.8 | 139 | 151 | 163 | 6 | 6.5 | 45.0 | 48.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 11 | 12 | 11 | 10 | 5 | 7.5 | 5 | 6 | 60.3 | 31.0 | 31.0 | 31.0 | 5 | 12 | 44.0 | 47.0 | 5 | 12 | 27.0 | 28.0 | 5 | 6 | 6 | 6 | 65.1 | 140 | 152 | 164 | 6 | 6.5 | 44.0 | 49.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 12 | 13 | 11 | 10 | 5 | 7 | 6 | 7.5 | 62.6 | 32.0 | 32.0 | 36.0 | 5 | 12 | 43.0 | 46.0 | 5 | 12 | 27.0 | 28.0 | 5 | 6 | 6 | 6.5 | 64.4 | 141 | 153 | 165 | 6 | 6.5 | 44.0 | 49.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 13 | 14 | 12 | 10 | 5 | 6.5 | 6 | 8 | 61.3 | 33.0 | 33.0 | 37.0 | 5 | 12 | 42.0 | 46.0 | 5 | 12 | 27.0 | 28.0 | 6 | 8 | 6 | 7 | 63.0 | 142 | 154 | 166 | 6 | 7 | 44.0 | 49.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 13 | 15 | 12 | 10 | 5 | 6.5 | 6 | 7 | 59.3 | 33.0 | 37.0 | 37.0 | 6 | 15 | 45.0 | 48.0 | 6 | 15 | 30.0 | 31.0 | 6 | 7.5 | 6 | 6.5 | 62.8 | 143 | 155 | 167 | 6 | 7 | 44.0 | 49.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 14 | 16 | 13 | 10 | 5 | 6 | 6 | 7.5 | 58.8 | 34.0 | 38.0 | 38.0 | 6 | 15 | 44.0 | 48.0 | 6 | 15 | 30.0 | 31.0 | 6 | 7 | 6 | 7 | 61.8 | 144 | 156 | 168 | 6 | 7 | 44.0 | 49.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 15 | 17 | 13 | 10 | 6 | 8 | 6 | 6.5 | 64.6 | 35.0 | 39.0 | 39.0 | 6 | 15 | 50.0 | 54.0 | 6 | 15 | 36.0 | 37.0 | 6 | 7 | 6 | 6.5 | 61.4 | 145 | 157 | 169 | 6 | 6.5 | 44.0 | 50.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 16 | 18 | 14 | 10 | 6 | 8 | 6 | 7 | 64.6 | 36.0 | 40.0 | 40.0 | 6 | 15 | 49.0 | 54.0 | 6 | 15 | 35.0 | 37.0 | 6 | 6.5 | 6 | 6.5 | 60.5 | 146 | 158 | 170 | 6 | 6.5 | 44.0 | 50.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 17 | 19 | 14 | 10 | 6 | 7.5 | 6 | 6.5 | 64.5 | 37.0 | 41.0 | 41.0 | 6 | 14 | 49.0 | 54.0 | 6 | 14 | 35.0 | 37.0 | 6 | 6.5 | 6 | 6.5 | 60.4 | 147 | 159 | 171 | 6 | 6 | 44.0 | 50.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 18 | 20 | 15 | 10 | 6 | 7 | 6 | 6.5 | 64.9 | 42.0 | 42.0 | 42.0 | 6 | 13 | 48.0 | 54.0 | 6 | 13 | 34.0 | 36.0 | 6 | 6.5 | 6 | 6.5 | 60.3 | 148 | 160 | 172 | 6 | 6 | 44.0 | 50.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 19 | 21 | 15 | 10 | 6 | 6.5 | 6 | 6.5 | 65.1 | 43.0 | 43.0 | 43.0 | 6 | 13 | 48.0 | 54.0 | 6 | 13 | 33.0 | 35.0 | 6 | 6.5 | 6 | 6.5 | 60.4 | 149 | 161 | 173 | 7 | 7.5 | 47.0 | 53.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 20 | 22 | 16 | 10 | 6 | 6.5 | 6 | 6.5 | 65.5 | 44.0 | 44.0 | 44.0 | 6 | 12 | 48.0 | 53.0 | 6 | 12 | 33.0 | 34.0 | 6 | 6 | 6 | 7 | 60.5 | 150 | 162 | 174 | 7 | 7.5 | 47.0 | 53.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 20 | 23 | 16 | 10 | 6 | 6.5 | 6 | 6.5 | 63.5 | 44.0 | 44.0 | 44.0 | 6 | 12 | 47.0 | 53.0 | 6 | 12 | 33.0 | 35.0 | 6 | 6 | 6 | 7.5 | 58.9 | 151 | 163 | 175 | 7 | 7.5 | 46.0 | 53.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 21 | 24 | 16 | 10 | 6 | 6 | 6 | 6 | 63.9 | 45.0 | 45.0 | 45.0 | 6 | 12 | 47.0 | 53.0 | 6 | 12 | 32.0 | 34.0 | 6 | 6 | 6 | 7 | 59.1 | 152 | 164 | 176 | 7 | 7.5 | 46.0 | 53.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 22 | 24 | 17 | 10 | 6 | 6 | 6 | 6 | 64.4 | 46.0 | 46.0 | 46.0 | 7 | 15 | 52.0 | 58.0 | 7 | 15 | 37.0 | 38.0 | 6 | 6 | 6 | 7 | 59.0 | 152 | 164 | 176 | 7 | 7 | 46.0 | 53.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 23 | 25 | 17 | 10 | 6 | 6 | 6 | 6 | 64.6 | 47.0 | 47.0 | 47.0 | 7 | 15 | 52.0 | 57.0 | 7 | 15 | 36.0 | 37.0 | 6 | 6 | 6 | 7 | 59.3 | 153 | 165 | 177 | 7 | 7 | 46.0 | 53.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 23 | 26 | 18 | 10 | 7 | 7.5 | 6 | 6 | 65.0 | 47.0 | 47.0 | 47.0 | 7 | 15 | 52.0 | 57.0 | 7 | 15 | 37.0 | 38.0 | 7 | 8 | 6 | 6.5 | 59.6 | 154 | 166 | 178 | 7 | 7 | 46.0 | 54.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 24 | 27 | 19 | 10 | 7 | 7.5 | 6 | 6 | 65.8 | 44.0 | 48.0 | 48.0 | 7 | 15 | 52.0 | 57.0 | 7 | 15 | 36.0 | 37.0 | 7 | 8 | 6 | 6.5 | 60.0 | 155 | 167 | 179 | 7 | 7 | 46.0 | 54.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 24 | 27 | 19 | 10 | 7 | 7 | 6 | 6 | 65.6 | 48.0 | 48.0 | 48.0 | 7 | 14 | 52.0 | 57.0 | 7 | 14 | 36.0 | 38.0 | 7 | 7.5 | 6 | 6.5 | 59.9 | 155 | 167 | 179 | 7 | 6.5 | 46.0 | 54.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 25 | 28 | 20 | 10 | 7 | 7 | 6 | 6 | 66.4 | 45.0 | 49.0 | 49.0 | 7 | 14 | 52.0 | 56.0 | 7 | 14 | 36.0 | 37.0 | 7 | 7.5 | 6 | 6 | 60.4 | 156 | 168 | 180 | 7 | 6.5 | 46.0 | 54.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 26 | 29 | 20 | 10 | 7 | 7 | 7 | 7.5 | 71.6 | 50.0 | 50.0 | 50.0 | 7 | 15 | 51.0 | 55.0 | 7 | 15 | 36.0 | 37.0 | 7 | 7.5 | 6 | 6 | 60.6 | 157 | 169 | 181 | 7 | 6.5 | 47.0 | 54.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.


DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 10 FEET
HEIGHT (HT): 11 THRU 13 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
15 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|-------|-------|---------|------|---------|------|------------------------------------|------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 8 | 8 | 5 | 6.5 | 5 | 9 | 58.5 | 29.0 | 29.0 | 33.0 | 5 | 13 | 108.5 | 80.5 | 5 | 13 | 30.0 | 33.0 | 5 | 8.5 | 5 | 6 | 52.6 | 77 | 89 | 101 | 6 | 7 | 50.0 | 53.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 2 FT | 14 | 9 | 8 | 8 | 5 | 6 | 4 | 6 | 55.5 | 30.0 | 30.0 | 30.0 | 5 | 14 | 106.5 | 80.5 | 5 | 14 | 29.0 | 28.0 | 5 | 7.5 | 6 | 6.5 | 50.8 | 77 | 89 | 101 | 6 | 6.5 | 49.0 | 52.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 4 FT | 10 | 9 | 8 | 8 | 5 | 6.5 | 5 | 6 | 49.1 | 30.0 | 30.0 | 30.0 | 5 | 12 | 66.0 | 82.0 | 5 | 12 | 32.0 | 33.0 | 5 | 7.5 | 6 | 6.5 | 45.9 | 77 | 89 | 101 | 6 | 6 | 49.0 | 52.0 | 5 | 11.5 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 6 FT | 10 | 10 | 8 | 8 | 5 | 7 | 5 | 6 | 42.8 | 30.0 | 30.0 | 30.0 | 5 | 12 | 53.0 | 63.0 | 5 | 12 | 30.0 | 31.0 | 5 | 7 | 5 | 6 | 39.8 | 78 | 90 | 102 | 6 | 6 | 47.0 | 52.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 8 FT | 10 | 11 | 8 | 8 | 5 | 7 | 6 | 7 | 43.0 | 26.0 | 30.0 | 30.0 | 6 | 15 | 52.0 | 56.0 | 6 | 15 | 32.0 | 32.0 | 5 | 6.5 | 5 | 6.5 | 37.4 | 79 | 91 | 103 | 6 | 6.5 | 46.0 | 52.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 10 FT | 11 | 12 | 8 | 8 | 5 | 7 | 5 | 6 | 37.6 | 27.0 | 31.0 | 31.0 | 6 | 15 | 50.0 | 55.0 | 6 | 15 | 31.0 | 32.0 | 5 | 6 | 5 | 7 | 35.6 | 80 | 92 | 104 | 6 | 6.5 | 45.0 | 52.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 12 FT | 12 | 13 | 8 | 8 | 5 | 7 | 5 | 6.5 | 36.0 | 28.0 | 32.0 | 32.0 | 6 | 15 | 48.0 | 54.0 | 6 | 15 | 31.0 | 32.0 | 5 | 6 | 5 | 7.5 | 34.6 | 81 | 93 | 105 | 6 | 6.5 | 45.0 | 52.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 14 FT | 13 | 14 | 8 | 8 | 5 | 6.5 | 5 | 7 | 34.6 | 33.0 | 33.0 | 33.0 | 6 | 15 | 47.0 | 54.0 | 6 | 15 | 31.0 | 32.0 | 6 | 8 | 5 | 7.5 | 33.8 | 82 | 94 | 106 | 6 | 6.5 | 44.0 | 53.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 16 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 7 | 33.6 | 34.0 | 34.0 | 34.0 | 6 | 14 | 46.0 | 53.0 | 6 | 14 | 30.0 | 32.0 | 6 | 7.5 | 5 | 7.5 | 33.1 | 83 | 95 | 107 | 6 | 6.5 | 44.0 | 53.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 18 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 6.5 | 37.9 | 35.0 | 35.0 | 35.0 | 6 | 14 | 51.0 | 59.0 | 6 | 14 | 36.0 | 38.0 | 6 | 7 | 5 | 7.5 | 32.6 | 84 | 96 | 108 | 6 | 6.5 | 44.0 | 53.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | | | | | | |
| 20 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 6.5 | 37.3 | 36.0 | 36.0 | 36.0 | 6 | 14 | 51.0 | 59.0 | 6 | 14 | 36.0 | 38.0 | 6 | 7 | 5 | 7 | 32.1 | 85 | 97 | 109 | 6 | 6.5 | 44.0 | 53.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | |
| 22 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6 | 36.9 | 37.0 | 37.0 | 37.0 | 6 | 14 | 50.0 | 59.0 | 6 | 14 | 36.0 | 38.0 | 6 | 6.5 | 5 | 6.5 | 31.9 | 86 | 98 | 110 | 6 | 6.5 | 44.0 | 53.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 24 FT | 18 | 19 | 8 | 8 | 6 | 7 | 5 | 6 | 36.5 | 38.0 | 38.0 | 38.0 | 6 | 13 | 50.0 | 59.0 | 6 | 13 | 36.0 | 38.0 | 6 | 6 | 5 | 6.5 | 31.6 | 87 | 99 | 111 | 6 | 6 | 44.0 | 53.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 26 FT | 19 | 21 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 40.4 | 39.0 | 39.0 | 43.0 | 6 | 13 | 50.0 | 59.0 | 6 | 13 | 35.0 | 38.0 | 6 | 6 | 6 | 7.5 | 34.4 | 89 | 101 | 113 | 7 | 7.5 | 47.0 | 56.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 28 FT | 20 | 22 | 9 | 8 | 6 | 6.5 | 5 | 6 | 37.1 | 40.0 | 40.0 | 40.0 | 6 | 12 | 49.0 | 58.0 | 6 | 12 | 35.0 | 37.0 | 6 | 6 | 5 | 6 | 31.9 | 90 | 102 | 114 | 7 | 7.5 | 47.0 | 56.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 30 FT | 21 | 23 | 10 | 8 | 6 | 6 | 5 | 6.5 | 37.9 | 41.0 | 41.0 | 41.0 | 6 | 12 | 49.0 | 58.0 | 6 | 12 | 34.0 | 37.0 | 7 | 8 | 5 | 6.5 | 32.4 | 91 | 103 | 115 | 7 | 7 | 47.0 | 56.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 32 FT | 22 | 24 | 10 | 8 | 6 | 6 | 5 | 6.5 | 37.8 | 42.0 | 42.0 | 42.0 | 7 | 15 | 54.0 | 63.0 | 7 | 15 | 39.0 | 41.0 | 7 | 7.5 | 5 | 6.5 | 32.5 | 92 | 104 | 116 | 7 | 7 | 47.0 | 57.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 34 FT | 23 | 25 | 10 | 8 | 7 | 7.5 | 5 | 6.5 | 37.8 | 43.0 | 43.0 | 43.0 | 7 | 15 | 54.0 | 63.0 | 7 | 15 | 38.0 | 40.0 | 7 | 7.5 | 5 | 6 | 32.5 | 93 | 105 | 117 | 7 | 6.5 | 47.0 | 57.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 36 FT | 24 | 25 | 10 | 8 | 7 | 7.5 | 5 | 6 | 36.5 | 44.0 | 44.0 | 44.0 | 7 | 14 | 54.0 | 62.0 | 7 | 14 | 37.0 | 39.0 | 7 | 7 | 5 | 6 | 31.6 | 93 | 105 | 117 | 7 | 6.5 | 47.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 38 FT | 25 | 26 | 10 | 8 | 7 | 7 | 5 | 6 | 36.6 | 45.0 | 45.0 | 45.0 | 7 | 14 | 53.0 | 62.0 | 7 | 14 | 37.0 | 38.0 | 7 | 7 | 5 | 6 | 31.8 | 94 | 106 | 118 | 7 | 6.5 | 47.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 40 FT | 25 | 27 | 10 | 8 | 7 | 6.5 | 5 | 6 | 36.8 | 45.0 | 45.0 | 45.0 | 7 | 13 | 53.0 | 62.0 | 7 | 13 | 37.0 | 39.0 | 7 | 7 | 6 | 7 | 34.6 | 95 | 107 | 119 | 7 | 6.5 | 46.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 42 FT | 26 | 28 | 10 | 8 | 7 | 7 | 6 | 7 | 40.8 | 50.0 | 50.0 | 50.0 | 7 | 13 | 53.0 | 62.0 | 7 | 13 | 37.0 | 38.0 | 7 | 7 | 6 | 7 | 34.9 | 96 | 108 | 120 | 7 | 6.5 | 46.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 44 FT | 27 | 29 | 10 | 8 | 7 | 6.5 | 6 | 7 | 40.9 | 51.0 | 51.0 | 51.0 | 7 | 13 | 53.0 | 61.0 | 7 | 13 | 36.0 | 37.0 | 7 | 7 | 6 | 6.5 | 35.0 | 97 | 109 | 121 | 7 | 6.5 | 46.0 | 56.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 46 FT | 28 | 29 | 11 | 8 | 7 | 6.5 | 6 | 7.5 | 41.6 | 52.0 | 52.0 | 52.0 | 7 | 13 | 53.0 | 61.0 | 7 | 13 | 36.0 | 37.0 | 7 | 6 | 6 | 7.5 | 35.6 | 97 | 109 | 121 | 7 | 6 | 47.0 | 57.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 48 FT | 28 | 30 | 11 | 8 | 7 | 6 | 6 | 7.5 | 41.8 | 52.0 | 52.0 | 52.0 | 7 | 12 | 53.0 | 61.0 | 7 | 12 | 36.0 | 37.0 | 7 | 6.5 | 6 | 7 | 35.6 | 98 | 110 | 122 | 7 | 6 | 47.0 | 57.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 50 FT | 29 | 31 | 11 | 8 | 7 | 6 | 6 | 7 | 41.9 | 53.0 | 53.0 | 53.0 | 7 | 12 | 53.0 | 60.0 | 7 | 12 | 36.0 | 37.0 | 7 | 6.5 | 6 | 7 | 35.9 | 99 | 111 | 123 | 7 | 6 | 47.0 | 57.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|--------|---------|------|------|-------|---------|------|------|------|------------------|------|---------|------|------|------|-------|---------|--------|------|------|---------|------|---------|------|--------------------------------------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | |
| | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 9 | 9 | 9 | 5 | 6.5 | 5 | 8 | 59.3 | 33.0 | 33.0 | 33.0 | 5 | 13 | 109.5 | 81.5 | 5 | 13 | 31.0 | 33.0 | 5 | 7.5 | 6 | 6 | 74.5 | 113 | 125 | 137 | 6 | 7 | 51.0 | 53.0 | 5 | 11.5 | 5 | 10.5 | 12 | | | | | | | | | | | | |
| 2 FT | 14 | 10 | 9 | 9 | 5 | 6 | 5 | 8 | 59.3 | 34.0 | 34.0 | 34.0 | 5 | 14 | 109.5 | 81.5 | 5 | 14 | 29.0 | 28.0 | 5 | 7.5 | 6 | 7 | 70.6 | 114 | 126 | 138 | 5 | 6 | 47.0 | 50.0 | 5 | 12 | 5 | 10.5 | 12 | | | | | | | | | | | | |
| 4 FT | 10 | 10 | 9 | 9 | 5 | 6.5 | 5 | 6 | 59.3 | 30.0 | 30.0 | 30.0 | 5 | 13 | 109.5 | 83.0 | 5 | 13 | 32.0 | 33.0 | 5 | 7 | 6 | 6.5 | 64.1 | 114 | 126 | 138 | 6 | 6.5 | 50.0 | 53.0 | 5 | 11.5 | 5 | 9.5 | 12 | | | | | | | | | | | | |
| 6 FT | 10 | 10 | 9 | 9 | 5 | 7 | 5 | 6 | 56.6 | 30.0 | 30.0 | 30.0 | 5 | 12 | 55.0 | 61.0 | 5 | 12 | 30.0 | 31.0 | 5 | 7 | 6 | 6 | 57.8 | 114 | 126 | 138 | 6 | 6 | 48.0 | 52.0 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | |
| 8 FT | 10 | 11 | 9 | 9 | 5 | 7 | 6 | 7.5 | 55.5 | 30.0 | 30.0 | 34.0 | 6 | 15 | 53.0 | 56.0 | 6 | 15 | 32.0 | 33.0 | 5 | 6.5 | 6 | 6 | 55.6 | 115 | 127 | 139 | 6 | 6 | 47.0 | 52.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | |
| 10 FT | 11 | 12 | 9 | 9 | 5 | 7 | 6 | 7 | 53.5 | 31.0 | 35.0 | 35.0 | 6 | 15 | 51.0 | 55.0 | 6 | 15 | 32.0 | 33.0 | 5 | 6 | 6 | 6 | 53.8 | 116 | 128 | 140 | 6 | 6.5 | 46.0 | 52.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 12 FT | 12 | 13 | 9 | 9 | 5 | 7 | 6 | 6.5 | 51.9 | 32.0 | 36.0 | 36.0 | 6 | 15 | 49.0 | 54.0 | 6 | 15 | 31.0 | 33.0 | 5 | 6 | 6 | 6 | 52.4 | 117 | 129 | 141 | 6 | 6.5 | 46.0 | 52.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 14 FT | 13 | 14 | 9 | 9 | 5 | 6.5 | 6 | 6 | 50.5 | 33.0 | 37.0 | 37.0 | 6 | 15 | 48.0 | 53.0 | 6 | 15 | 31.0 | 33.0 | 6 | 8 | 6 | 6 | 51.3 | 118 | 130 | 142 | 6 | 6.5 | 45.0 | 52.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | |
| 16 FT | 14 | 15 | 10 | 9 | 5 | 6 | 6 | 7 | 49.9 | 34.0 | 34.0 | 38.0 | 6 | 15 | 47.0 | 53.0 | 6 | 15 | 31.0 | 33.0 | 6 | 7.5 | 6 | 7 | 50.4 | 119 | 131 | 143 | 6 | 6.5 | 45.0 | 52.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 18 FT | 15 | 16 | 10 | 9 | 6 | 8 | 6 | 7 | 54.9 | 35.0 | 35.0 | 39.0 | 6 | 15 | 52.0 | 59.0 | 6 | 15 | 37.0 | 39.0 | 6 | 7 | 6 | 7 | 49.6 | 120 | 132 | 144 | 6 | 6.5 | 45.0 | 53.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 20 FT | 16 | 17 | 11 | 9 | 6 | 8 | 6 | 7.5 | 54.8 | 36.0 | 36.0 | 40.0 | 6 | 14 | 52.0 | 58.0 | 6 | 14 | 36.0 | 39.0 | 6 | 7 | 6 | 8 | 49.3 | 121 | 133 | 145 | 6 | 6.5 | 45.0 | 53.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 22 FT | 17 | 18 | 12 | 9 | 6 | 7.5 | 6 | 8 | 54.8 | 37.0 | 37.0 | 37.0 | 6 | 14 | 51.0 | 58.0 | 6 | 14 | 36.0 | 39.0 | 6 | 6.5 | 5 | 6 | 45.9 | 122 | 134 | 146 | 6 | 6.5 | 45.0 | 53.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 24 FT | 18 | 20 | 12 | 9 | 6 | 7 | 6 | 7.5 | 54.4 | 38.0 | 38.0 | 38.0 | 6 | 13 | 51.0 | 58.0 | 6 | 13 | 36.0 | 38.0 | 6 | 6 | 5 | 6 | 45.8 | 124 | 136 | 148 | 6 | 6 | 45.0 | 53.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 26 FT | 19 | 21 | 12 | 9 | 6 | 6.5 | 6 | 7 | 53.9 | 39.0 | 39.0 | 43.0 | 6 | 13 | 50.0 | 58.0 | 6 | 13 | 35.0 | 38.0 | 6 | 6 | 6 | 8.5 | 48.4 | 125 | 137 | 149 | 7 | 7.5 | 48.0 | 56.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 28 FT | 20 | 22 | 13 | 9 | 6 | 6.5 | 6 | 7.5 | 54.3 | 40.0 | 40.0 | 40.0 | 6 | 12 | 50.0 | 58.0 | 6 | 12 | 35.0 | 37.0 | 6 | 6 | 5 | 6 | 45.4 | 126 | 138 | 150 | 7 | 7.5 | 48.0 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 30 FT | 21 | 23 | 13 | 9 | 6 | 6 | 6 | 7 | 54.1 | 41.0 | 41.0 | 41.0 | 6 | 12 | 50.0 | 57.0 | 6 | 12 | 34.0 | 36.0 | 7 | 8 | 5 | 6 | 45.4 | 127 | 139 | 151 | 7 | 7 | 48.0 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 32 FT | 22 | 24 | 13 | 9 | 6 | 6 | 6 | 6.5 | 54.1 | 42.0 | 42.0 | 46.0 | 7 | 15 | 54.0 | 62.0 | 7 | 15 | 39.0 | 41.0 | 7 | 7.5 | 6 | 8 | 48.4 | 128 | 140 | 152 | 7 | 7 | 48.0 | 57.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 34 FT | 23 | 25 | 14 | 9 | 7 | 7.5 | 6 | 7 | 54.8 | 43.0 | 43.0 | 43.0 | 7 | 15 | 54.0 | 62.0 | 7 | 15 | 38.0 | 40.0 | 7 | 7.5 | 5 | 6 | 45.8 | 129 | 141 | 153 | 7 | 6.5 | 48.0 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 36 FT | 23 | 25 | 14 | 9 | 7 | 7 | 6 | 7 | 53.3 | 43.0 | 43.0 | 43.0 | 7 | 14 | 54.0 | 62.0 | 7 | 14 | 38.0 | 40.0 | 7 | 7 | 5 | 6 | 44.1 | 129 | 141 | 153 | 7 | 6.5 | 48.0 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 38 FT | 24 | 26 | 14 | 9 | 7 | 7.5 | 6 | 7 | 53.4 | 44.0 | 44.0 | 44.0 | 7 | 14 | 54.0 | 61.0 | 7 | 14 | 38.0 | 40.0 | 7 | 7 | 5 | 6 | 44.3 | 130 | 142 | 154 | 7 | 6.5 | 48.0 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 40 FT | 25 | 27 | 14 | 9 | 7 | 7 | 6 | 6.5 | 53.4 | 45.0 | 45.0 | 45.0 | 7 | 14 | 54.0 | 61.0 | 7 | 14 | 37.0 | 39.0 | 7 | 7 | 5 | 6 | 44.5 | 131 | 143 | 155 | 7 | 6.5 | 48.0 | 57.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 42 FT | 26 | 28 | 15 | 9 | 7 | 7 | 6 | 7 | 54.3 | 46.0 | 50.0 | 50.0 | 7 | 13 | 54.0 | 60.0 | 7 | 13 | 37.0 | 38.0 | 7 | 7 | 6 | 8 | 48.0 | 132 | 144 | 156 | 7 | 6 | 48.0 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 44 FT | 27 | 29 | 15 | 9 | 7 | 6.5 | 6 | 6.5 | 54.3 | 51.0 | 51.0 | 51.0 | 7 | 13 | 53.0 | 60.0 | 7 | 13 | 36.0 | 38.0 | 7 | 7 | 6 | 8 | 48.1 | 133 | 145 | 157 | 7 | 6 | 48.0 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 46 FT | 27 | 30 | 15 | 9 | 7 | 6.5 | 6 | 6 | 54.4 | 51.0 | 51.0 | 51.0 | 7 | 13 | 53.0 | 60.0 | 7 | 13 | 37.0 | 38.0 | 7 | 7 | 6 | 8 | 48.1 | 134 | 146 | 158 | 7 | 6 | 48.0 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 48 FT | 28 | 30 | 16 | 9 | 7 | 6.5 | 6 | 6.5 | 55.0 | 52.0 | 52.0 | 52.0 | 7 | 13 | 53.0 | 59.0 | 7 | 13 | 36.0 | 37.0 | 7 | 6 | 6 | 7.5 | 48.5 | 134 | 146 | 158 | 7 | 6 | 48.0 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 50 FT | 29 | 31 | 16 | 9 | 7 | 6.5 | 6 | 6.5 | 55.1 | 53.0 | 53.0 | 53.0 | 7 | 13 | 53.0 | 59.0 | 7 | 13 | 36.0 | 37.0 | 7 | 6.5 | 6 | 7.5 | 48.8 | 135 | 147 | 159 | 7 | 6 | 48.0 | 57.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |

| SPAN (S) = 11 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 12 FT OR 13 FT OR 14 FT | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|--------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|--------|--------|--------|---------|------|---------|------|---------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=12' | HT=13' | HT=14' | | | | | | | | | | | | | | HT=12' | HT=13' | HT=14' | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 13 | 10 | 10 | 11 | 5 | 6.5 | 5 | 6 | 60.3 | 33.0 | 33.0 | 33.0 | 5 | 13 | 110.5 | 82.5 | 5 | 13 | 31.0 | 33.0 | 5 | 7.5 | 6 | 6 | 89.3 | 150 | 162 | 174 | 5 | 6 | 51.0 | 51.0 | 5 | 10 | 5 | 8 | 12 | | | | | | | | | | | | | | | |
| 2 FT | 14 | 11 | 10 | 11 | 5 | 6 | 5 | 6 | 60.3 | 34.0 | 34.0 | 34.0 | 5 | 14 | 110.5 | 82.5 | 5 | 14 | 30.0 | 32.0 | 5 | 7.5 | 6 | 6 | 89.3 | 151 | 163 | 175 | 5 | 6 | 50.0 | 51.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | |
| 4 FT | 10 | 11 | 11 | 11 | 5 | 7 | 5 | 6 | 60.9 | 30.0 | 30.0 | 30.0 | 5 | 13 | 110.5 | 80.0 | 5 | 13 | 33.0 | 33.0 | 5 | 7 | 6 | 6.5 | 85.9 | 151 | 163 | 175 | 5 | 6 | 49.0 | 51.0 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | |
| 6 FT | 10 | 11 | 11 | 11 | 5 | 7.5 | 5 | 6 | 79.0 | 30.0 | 30.0 | 30.0 | 5 | 12 | 58.0 | 57.0 | 5 | 12 | 31.0 | 31.0 | 5 | 6.5 | 6 | 6 | 77.5 | 151 | 163 | 175 | 6 | 6.5 | 50.0 | 53.0 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | |
| 8 FT | 10 | 11 | 12 | 11 | 5 | 7.5 | 6 | 7.5 | 70.1 | 30.0 | 30.0 | 34.0 | 6 | 15 | 54.0 | 55.0 | 6 | 15 | 33.0 | 33.0 | 5 | 6.5 | 6 | 6 | 70.9 | 151 | 163 | 175 | 6 | 6 | 48.0 | 52.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 10 FT | 11 | 12 | 12 | 11 | 5 | 7.5 | 6 | 8 | 68.5 | 31.0 | 31.0 | 35.0 | 6 | 16 | 52.0 | 54.0 | 6 | 16 | 32.0 | 33.0 | 5 | 6 | 6 | 6 | 69.9 | 152 | 164 | 176 | 6 | 6 | 47.0 | 52.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 12 FT | 12 | 13 | 12 | 11 | 5 | 7 | 6 | 8 | 67.4 | 32.0 | 32.0 | 36.0 | 6 | 16 | 50.0 | 53.0 | 6 | 16 | 32.0 | 33.0 | 5 | 6 | 6 | 6.5 | 69.0 | 153 | 165 | 177 | 6 | 6 | 47.0 | 52.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 14 FT | 13 | 14 | 12 | 11 | 5 | 6.5 | 6 | 7 | 66.4 | 33.0 | 37.0 | 37.0 | 6 | 16 | 49.0 | 53.0 | 6 | 16 | 32.0 | 33.0 | 6 | 8 | 6 | 6.5 | 68.3 | 154 | 166 | 178 | 6 | 6.5 | 47.0 | 52.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 16 FT | 14 | 15 | 13 | 11 | 5 | 6 | 6 | 7 | 64.9 | 34.0 | 38.0 | 38.0 | 6 | 15 | 48.0 | 52.0 | 6 | 15 | 32.0 | 33.0 | 6 | 7.5 | 6 | 7 | 66.6 | 155 | 167 | 179 | 6 | 6.5 | 47.0 | 52.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 18 FT | 15 | 16 | 13 | 11 | 6 | 8 | 6 | 6.5 | 70.3 | 39.0 | 39.0 | 39.0 | 6 | 15 | 54.0 | 58.0 | 6 | 15 | 37.0 | 39.0 | 6 | 7 | 6 | 6 | 66.0 | 156 | 168 | 180 | 6 | 6.5 | 47.0 | 52.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 15 | 17 | 14 | 11 | 6 | 8 | 6 | 6.5 | 68.4 | 39.0 | 39.0 | 39.0 | 6 | 14 | 53.0 | 58.0 | 6 | 14 | 37.0 | 39.0 | 6 | 7 | 6 | 6.5 | 65.1 | 157 | 169 | 181 | 6 | 6.5 | 46.0 | 53.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 17 | 18 | 14 | 11 | 6 | 7.5 | 6 | 6.5 | 69.0 | 41.0 | 41.0 | 41.0 | 6 | 14 | 53.0 | 58.0 | 6 | 14 | 37.0 | 39.0 | 6 | 6 | 6 | 6 | 64.5 | 158 | 170 | 182 | 6 | 6 | 46.0 | 53.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 24 FT | 18 | 20 | 15 | 11 | 6 | 7 | 6 | 6.5 | 68.9 | 42.0 | 42.0 | 42.0 | 6 | 13 | 52.0 | 58.0 | 6 | 13 | 36.0 | 38.0 | 6 | 6 | 6 | 6 | 64.6 | 160 | 172 | 184 | 6 | 6 | 46.0 | 53.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 19 | 21 | 15 | 11 | 6 | 6.5 | 6 | 6 | 68.6 | 43.0 | 43.0 | 43.0 | 6 | 13 | 52.0 | 57.0 | 6 | 13 | 36.0 | 38.0 | 6 | 6 | 6 | 6 | 64.3 | 161 | 173 | 185 | 7 | 7.5 | 49.0 | 56.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 28 FT | 20 | 22 | 16 | 11 | 6 | 6.5 | 6 | 6 | 68.6 | 44.0 | 44.0 | 44.0 | 6 | 12 | 51.0 | 57.0 | 6 | 12 | 35.0 | 37.0 | 6 | 6 | 6 | 6 | 63.9 | 162 | 174 | 186 | 7 | 7.5 | 49.0 | 56.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 21 | 23 | 17 | 11 | 6 | 6 | 6 | 6 | 69.0 | 45.0 | 45.0 | 45.0 | 6 | 12 | 51.0 | 57.0 | 6 | 12 | 34.0 | 36.0 | 7 | 8 | 6 | 6.5 | 64.0 | 163 | 175 | 187 | 7 | 7 | 49.0 | 57.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 32 FT | 21 | 24 | 17 | 11 | 6 | 6 | 6 | 6 | 68.6 | 45.0 | 45.0 | 45.0 | 6 | 12 | 51.0 | 57.0 | 6 | 12 | 35.0 | 37.0 | 7 | 7.5 | 6 | 6.5 | 64.1 | 164 | 176 | 188 | 7 | 7 | 49.0 | 57.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 22 | 25 | 18 | 11 | 6 | 6 | 6 | 6 | 69.1 | 46.0 | 46.0 | 46.0 | 7 | 15 | 55.0 | 62.0 | 7 | 15 | 40.0 | 41.0 | 7 | 7.5 | 6 | 6.5 | 64.4 | 165 | 177 | 189 | 7 | 6.5 | 49.0 | 57.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 23 | 26 | 18 | 11 | 7 | 7.5 | 7 | 7.5 | 74.3 | 47.0 | 47.0 | 47.0 | 7 | 15 | 55.0 | 61.0 | 7 | 15 | 39.0 | 41.0 | 7 | 7.5 | 6 | 6 | 64.5 | 166 | 178 | 190 | 7 | 6.5 | 49.0 | 57.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 24 | 26 | 18 | 11 | 7 | 7.5 | 7 | 8 | 72.6 | 48.0 | 48.0 | 48.0 | 7 | 14 | 55.0 | 61.0 | 7 | 14 | 38.0 | 40.0 | 7 | 7 | 6 | 6.5 | 62.4 | 166 | 178 | 190 | 7 | 6.5 | 49.0 | 57.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 25 | 27 | 18 | 11 | 7 | 7 | 7 | 7 | 72.9 | 49.0 | 49.0 | 49.0 | 7 | 14 | 55.0 | 61.0 | 7 | 14 | 38.0 | 39.0 | 7 | 7 | 6 | 6 | 62.6 | 167 | 179 | 191 | 7 | 6.5 | 49.0 | 57.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 42 FT | 25 | 28 | 19 | 11 | 7 | 7 | 7 | 7 | 73.3 | 49.0 | 49.0 | 49.0 | 7 | 14 | 55.0 | 60.0 | 7 | 14 | 38.0 | 40.0 | 7 | 7 | 6 | 6 | 62.9 | 168 | 180 | 192 | 7 | 6.5 | 49.0 | 57.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 44 FT | 26 | 29 | 20 | 11 | 7 | 7 | 7 | 7.5 | 74.0 | 50.0 | 50.0 | 50.0 | 7 | 13 | 54.0 | 60.0 | 7 | 13 | 38.0 | 39.0 | 7 | 7 | 6 | 6 | 63.3 | 169 | 181 | 193 | 7 | 6 | 49.0 | 57.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 46 FT | 27 | 30 | 21 | 11 | 7 | 6.5 | 7 | 7.5 | 74.6 | 51.0 | 51.0 | 51.0 | 7 | 13 | 54.0 | 59.0 | 7 | 13 | 37.0 | 38.0 | 7 | 7 | 6 | 6 | 63.6 | 170 | 182 | 194 | 7 | 6 | 49.0 | 57.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 48 FT | 27 | 30 | 21 | 11 | 7 | 6 | 7 | 7 | 74.5 | 51.0 | 51.0 | 51.0 | 7 | 12 | 54.0 | 59.0 | 7 | 12 | 37.0 | 39.0 | 7 | 6 | 6 | 6 | 63.5 | 170 | 182 | 194 | 7 | 6 | 49.0 | 57.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |
| 50 FT | 28 | 31 | 22 | 11 | 7 | 6.5 | 7 | 7 | 75.3 | 52.0 | 52.0 | 58.0 | 7 | 13 | 54.0 | 59.0 | 7 | 13 | 37.0 | 38.0 | 7 | 6.5 | 7 | 7.5 | 67.0 | 171 | 183 | 195 | 7 | 6 | 49.0 | 58.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

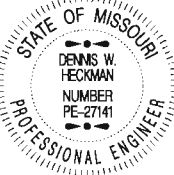
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 11 FEET
HEIGHT (HT): 12 THRU 14 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

703.87

SHEET NO.
17 OF 27

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 6 FT OR 7 FT OR 8 FT | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|-------|-------|---------|------|---------|------|------------------------------------|------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | | | HT=6' | HT=7' | HT=8' | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 9 | 8 | 8 | 5 | 6 | 4 | 6 | 59.1 | 30.0 | 30.0 | 30.0 | 5 | 12 | 114.5 | 86.5 | 5 | 12 | 31.0 | 34.0 | 5 | 7.5 | 6 | 7 | 54.6 | 77 | 89 | 101 | 6 | 6.5 | 53.0 | 56.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 2 FT | 14 | 9 | 8 | 8 | 5 | 6 | 5 | 8.5 | 62.1 | 30.0 | 30.0 | 34.0 | 5 | 12 | 116.5 | 86.5 | 5 | 12 | 30.0 | 33.0 | 5 | 7.5 | 6 | 6.5 | 50.3 | 77 | 89 | 101 | 6 | 6 | 52.0 | 55.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 10 | 8 | 8 | 5 | 6 | 5 | 6.5 | 48.9 | 31.0 | 31.0 | 31.0 | 5 | 12 | 69.0 | 88.0 | 5 | 12 | 33.0 | 35.0 | 5 | 7 | 5 | 6 | 42.6 | 78 | 90 | 102 | 6 | 6 | 51.0 | 56.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 11 | 8 | 8 | 5 | 6.5 | 5 | 6.5 | 42.8 | 31.0 | 31.0 | 31.0 | 6 | 16 | 59.0 | 71.0 | 6 | 16 | 34.0 | 36.0 | 5 | 6.5 | 5 | 6.5 | 39.3 | 79 | 91 | 103 | 6 | 6.5 | 49.0 | 56.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 12 | 8 | 8 | 5 | 6.5 | 5 | 6 | 39.9 | 31.0 | 31.0 | 31.0 | 6 | 14 | 55.0 | 61.0 | 6 | 14 | 33.0 | 34.0 | 5 | 6 | 5 | 7.5 | 36.6 | 80 | 92 | 104 | 6 | 6.5 | 48.0 | 56.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 13 | 8 | 8 | 5 | 6.5 | 5 | 6.5 | 37.3 | 32.0 | 32.0 | 32.0 | 6 | 14 | 52.0 | 59.0 | 6 | 14 | 32.0 | 34.0 | 5 | 6 | 5 | 7.5 | 34.9 | 81 | 93 | 105 | 6 | 6 | 47.0 | 56.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 14 | 8 | 8 | 5 | 6 | 5 | 7 | 35.4 | 33.0 | 33.0 | 33.0 | 6 | 14 | 51.0 | 58.0 | 6 | 14 | 32.0 | 34.0 | 6 | 8 | 5 | 8 | 33.8 | 82 | 94 | 106 | 6 | 6 | 47.0 | 56.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 14 FT | 14 | 15 | 8 | 8 | 5 | 6 | 5 | 7 | 33.9 | 34.0 | 34.0 | 34.0 | 6 | 13 | 49.0 | 57.0 | 6 | 13 | 32.0 | 34.0 | 6 | 7.5 | 5 | 8 | 32.8 | 83 | 95 | 107 | 6 | 6 | 47.0 | 56.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 16 FT | 15 | 16 | 8 | 8 | 6 | 8 | 5 | 6.5 | 37.9 | 35.0 | 35.0 | 35.0 | 6 | 13 | 55.0 | 63.0 | 6 | 13 | 37.0 | 40.0 | 6 | 7 | 5 | 8 | 32.1 | 84 | 96 | 108 | 6 | 6 | 46.0 | 56.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | |
| 18 FT | 16 | 17 | 8 | 8 | 6 | 8 | 5 | 6.5 | 37.0 | 36.0 | 36.0 | 36.0 | 6 | 13 | 54.0 | 63.0 | 6 | 13 | 37.0 | 40.0 | 6 | 7 | 5 | 7 | 31.6 | 85 | 97 | 109 | 6 | 6 | 46.0 | 56.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 20 FT | 17 | 18 | 8 | 8 | 6 | 7.5 | 5 | 6.5 | 36.4 | 37.0 | 37.0 | 37.0 | 6 | 12 | 53.0 | 63.0 | 6 | 12 | 37.0 | 40.0 | 6 | 6.5 | 5 | 6.5 | 31.1 | 86 | 98 | 110 | 6 | 6 | 46.0 | 56.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | |
| 22 FT | 18 | 20 | 8 | 8 | 6 | 6.5 | 5 | 6 | 36.1 | 38.0 | 38.0 | 38.0 | 6 | 12 | 53.0 | 62.0 | 6 | 12 | 37.0 | 40.0 | 6 | 6 | 5 | 6 | 30.8 | 88 | 100 | 112 | 6 | 6 | 46.0 | 57.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 24 FT | 20 | 21 | 8 | 8 | 6 | 6.5 | 6 | 7.5 | 39.5 | 44.0 | 44.0 | 44.0 | 6 | 12 | 52.0 | 62.0 | 6 | 12 | 36.0 | 39.0 | 7 | 8 | 6 | 7.5 | 33.8 | 89 | 101 | 113 | 7 | 7.5 | 49.0 | 59.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 26 FT | 21 | 22 | 8 | 8 | 6 | 6 | 6 | 7 | 39.3 | 45.0 | 45.0 | 45.0 | 6 | 12 | 52.0 | 62.0 | 6 | 12 | 36.0 | 39.0 | 7 | 7.5 | 6 | 7 | 33.6 | 90 | 102 | 114 | 7 | 7.5 | 49.0 | 60.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 28 FT | 22 | 23 | 8 | 8 | 6 | 6 | 6 | 6.5 | 39.0 | 46.0 | 46.0 | 46.0 | 7 | 15 | 57.0 | 67.0 | 7 | 15 | 41.0 | 44.0 | 7 | 7 | 6 | 6.5 | 33.4 | 91 | 103 | 115 | 7 | 7 | 49.0 | 60.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 30 FT | 23 | 24 | 8 | 8 | 7 | 7.5 | 6 | 6 | 38.9 | 47.0 | 47.0 | 47.0 | 7 | 15 | 56.0 | 67.0 | 7 | 15 | 40.0 | 43.0 | 7 | 6.5 | 6 | 6 | 33.4 | 92 | 104 | 116 | 7 | 6.5 | 49.0 | 60.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 32 FT | 24 | 25 | 9 | 8 | 7 | 7.5 | 6 | 7 | 39.8 | 48.0 | 48.0 | 48.0 | 7 | 14 | 56.0 | 66.0 | 7 | 14 | 40.0 | 42.0 | 7 | 6.5 | 6 | 7 | 34.0 | 93 | 105 | 117 | 7 | 6.5 | 49.0 | 60.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 34 FT | 25 | 26 | 9 | 8 | 7 | 7 | 6 | 6.5 | 39.8 | 49.0 | 49.0 | 49.0 | 7 | 14 | 56.0 | 66.0 | 7 | 14 | 39.0 | 42.0 | 7 | 6 | 6 | 6.5 | 34.0 | 94 | 106 | 118 | 7 | 6 | 49.0 | 60.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 36 FT | 26 | 27 | 9 | 8 | 7 | 7 | 6 | 6.5 | 39.8 | 50.0 | 50.0 | 50.0 | 7 | 13 | 56.0 | 66.0 | 7 | 13 | 39.0 | 41.0 | 7 | 6 | 6 | 6.5 | 34.1 | 95 | 107 | 119 | 7 | 6 | 49.0 | 60.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 38 FT | 27 | 28 | 9 | 8 | 7 | 6.5 | 6 | 6 | 39.8 | 51.0 | 51.0 | 51.0 | 7 | 13 | 56.0 | 66.0 | 7 | 13 | 38.0 | 40.0 | 7 | 6 | 6 | 6 | 34.3 | 96 | 108 | 120 | 7 | 6 | 49.0 | 60.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 40 FT | 28 | 29 | 9 | 8 | 7 | 6.5 | 6 | 6 | 38.9 | 52.0 | 52.0 | 52.0 | 7 | 12 | 56.0 | 65.0 | 7 | 12 | 37.0 | 39.0 | 7 | 6.5 | 6 | 6 | 33.4 | 97 | 109 | 121 | 8 | 7.5 | 55.0 | 66.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 42 FT | 28 | 30 | 10 | 8 | 7 | 6 | 6 | 6.5 | 39.8 | 52.0 | 52.0 | 52.0 | 7 | 12 | 56.0 | 65.0 | 7 | 12 | 38.0 | 40.0 | 7 | 6.5 | 6 | 6.5 | 33.9 | 98 | 110 | 122 | 8 | 7.5 | 55.0 | 66.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | |
| 44 FT | 29 | 31 | 10 | 8 | 7 | 6 | 6 | 6.5 | 39.9 | 53.0 | 53.0 | 53.0 | 7 | 12 | 55.0 | 64.0 | 7 | 12 | 38.0 | 39.0 | 7 | 6.5 | 6 | 6 | 34.0 | 99 | 111 | 123 | 8 | 7.5 | 55.0 | 66.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |
| 46 FT | 30 | 32 | 10 | 8 | 7 | 6 | 6 | 6 | 40.0 | 54.0 | 54.0 | 54.0 | 7 | 12 | 55.0 | 64.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 6 | 34.3 | 100 | 112 | 124 | 8 | 7.5 | 55.0 | 66.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 48 FT | 31 | 33 | 10 | 8 | 8 | 7.5 | 6 | 6 | 40.1 | 55.0 | 55.0 | 55.0 | 8 | 15 | 63.0 | 71.0 | 8 | 15 | 45.0 | 46.0 | 7 | 6 | 7 | 6.5 | 37.5 | 101 | 113 | 125 | 8 | 7.5 | 55.0 | 66.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | |
| 50 FT | 32 | 34 | 11 | 8 | 8 | 7.5 | 6 | 6.5 | 41.0 | 56.0 | 56.0 | 56.0 | 7 | 12 | 55.0 | 63.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 6 | 35.1 | 102 | 114 | 126 | 8 | 7 | 55.0 | 66.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 9 FT OR 10 FT OR 11 FT | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|--------|--------|---------|------|-------|------|---------|------|------|------|------------------|------|---------|------|------|-----|-------|--------|---------|------|------|--------------------------------------|---------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | |
| | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | | | | | | HT=9' | HT=10' | HT=11' | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 8 | 9 | 5 | 6 | 5 | 7.5 | 62.3 | 34.0 | 34.0 | 34.0 | 5 | 12 | 117.5 | 87.5 | 5 | 12 | 31.0 | 35.0 | 5 | 7.5 | 6 | 6 | 79.4 | 114 | 126 | 138 | 5 | 6 | 51.0 | 54.0 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | |
| 2 FT | 14 | 10 | 9 | 9 | 5 | 6 | 5 | 8 | 62.9 | 34.0 | 34.0 | 34.0 | 5 | 12 | 117.5 | 87.5 | 5 | 12 | 30.0 | 33.0 | 5 | 7 | 6 | 6.5 | 68.6 | 114 | 126 | 138 | 6 | 6.5 | 53.0 | 56.0 | 5 | 12 | 5 | 10.5 | 12 | | | | | | | | | | |
| 4 FT | 11 | 10 | 9 | 9 | 5 | 6 | 6 | 7 | 75.1 | 31.0 | 31.0 | 35.0 | 5 | 12 | 82.0 | 89.0 | 5 | 12 | 34.0 | 36.0 | 5 | 7 | 6 | 6 | 61.3 | 114 | 126 | 138 | 6 | 6 | 52.0 | 56.0 | 5 | 12 | 5 | 10 | 12 | | | | | | | | | | |
| 6 FT | 11 | 11 | 9 | 9 | 5 | 6.5 | 6 | 7 | 59.8 | 31.0 | 31.0 | 35.0 | 6 | 16 | 61.0 | 70.0 | 6 | 16 | 35.0 | 36.0 | 5 | 6.5 | 6 | 6 | 57.5 | 115 | 127 | 139 | 6 | 6 | 50.0 | 56.0 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | |
| 8 FT | 11 | 12 | 9 | 9 | 5 | 6.5 | 6 | 7 | 55.3 | 31.0 | 31.0 | 35.0 | 6 | 15 | 56.0 | 60.0 | 6 | 15 | 33.0 | 34.0 | 5 | 6 | 6 | 6.5 | 54.5 | 116 | 128 | 140 | 6 | 6 | 49.0 | 56.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | |
| 10 FT | 12 | 13 | 9 | 9 | 5 | 6.5 | 6 | 6.5 | 52.5 | 32.0 | 32.0 | 36.0 | 6 | 14 | 54.0 | 59.0 | 6 | 14 | 33.0 | 34.0 | 5 | 6 | 6 | 6.5 | 52.4 | 117 | 129 | 141 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | |
| 12 FT | 13 | 14 | 9 | 9 | 5 | 6 | 6 | 6.5 | 50.4 | 33.0 | 33.0 | 37.0 | 6 | 14 | 52.0 | 58.0 | 6 | 14 | 32.0 | 34.0 | 6 | 8 | 6 | 6.5 | 50.6 | 118 | 130 | 142 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | |
| 14 FT | 14 | 15 | 9 | 9 | 5 | 6 | 6 | 6.5 | 48.8 | 34.0 | 34.0 | 38.0 | 6 | 14 | 51.0 | 57.0 | 6 | 14 | 32.0 | 34.0 | 6 | 7.5 | 6 | 6.5 | 49.4 | 119 | 131 | 143 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | |
| 16 FT | 15 | 16 | 10 | 9 | 6 | 8 | 6 | 7.5 | 54.3 | 35.0 | 35.0 | 39.0 | 6 | 13 | 55.0 | 63.0 | 6 | 13 | 38.0 | 40.0 | 6 | 7 | 6 | 7.5 | 48.5 | 120 | 132 | 144 | 6 | 6 | 47.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 18 FT | 16 | 17 | 11 | 9 | 6 | 8 | 6 | 8 | 54.3 | 36.0 | 36.0 | 36.0 | 6 | 13 | 55.0 | 62.0 | 6 | 13 | 38.0 | 40.0 | 6 | 7 | 5 | 6 | 45.4 | 121 | 133 | 145 | 6 | 6 | 47.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 20 FT | 17 | 18 | 11 | 9 | 6 | 7.5 | 6 | 7.5 | 53.6 | 37.0 | 37.0 | 41.0 | 6 | 13 | 54.0 | 62.0 | 6 | 13 | 37.0 | 40.0 | 6 | 6 | 6 | 8 | 47.8 | 122 | 134 | 146 | 6 | 6 | 47.0 | 56.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | |
| 22 FT | 18 | 20 | 11 | 9 | 6 | 7 | 6 | 6.5 | 53.3 | 38.0 | 38.0 | 42.0 | 6 | 12 | 54.0 | 62.0 | 6 | 12 | 37.0 | 40.0 | 6 | 6 | 6 | 7.5 | 47.5 | 124 | 136 | 148 | 6 | 6 | 47.0 | 57.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | |
| 24 FT | 19 | 21 | 12 | 9 | 6 | 6.5 | 6 | 7 | 53.5 | 39.0 | 39.0 | 39.0 | 6 | 12 | 53.0 | 62.0 | 6 | 12 | 37.0 | 40.0 | 7 | 8 | 5 | 6 | 44.5 | 125 | 137 | 149 | 7 | 7.5 | 50.0 | 60.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | |
| 26 FT | 20 | 22 | 13 | 9 | 6 | 6 | 6 | 7.5 | 53.9 | 40.0 | 40.0 | 40.0 | 6 | 12 | 53.0 | 61.0 | 6 | 12 | 37.0 | 40.0 | 7 | 7.5 | 5 | 6 | 44.6 | 126 | 138 | 150 | 7 | 7.5 | 50.0 | 60.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | |
| 28 FT | 22 | 23 | 13 | 9 | 6 | 6 | 6 | 7.5 | 53.5 | 42.0 | 42.0 | 42.0 | 7 | 15 | 57.0 | 66.0 | 7 | 15 | 40.0 | 43.0 | 7 | 7 | 5 | 6 | 44.5 | 127 | 139 | 151 | 7 | 7 | 50.0 | 60.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 30 FT | 23 | 25 | 13 | 9 | 7 | 7.5 | 6 | 7 | 53.4 | 43.0 | 43.0 | 43.0 | 7 | 15 | 57.0 | 66.0 | 7 | 15 | 40.0 | 42.0 | 7 | 7 | 5 | 6 | 44.4 | 129 | 141 | 153 | 7 | 6.5 | 50.0 | 60.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 32 FT | 24 | 26 | 13 | 9 | 7 | 7.5 | 6 | 6.5 | 53.3 | 44.0 | 44.0 | 48.0 | 7 | 14 | 57.0 | 66.0 | 7 | 14 | 40.0 | 42.0 | 7 | 7 | 6 | 8.5 | 47.4 | 130 | 142 | 154 | 7 | 6.5 | 50.0 | 60.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 34 FT | 25 | 26 | 13 | 9 | 7 | 7 | 6 | 6 | 53.0 | 45.0 | 45.0 | 49.0 | 7 | 14 | 57.0 | 65.0 | 7 | 14 | 39.0 | 41.0 | 7 | 6 | 6 | 7.5 | 47.3 | 130 | 142 | 154 | 7 | 6 | 50.0 | 60.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 36 FT | 26 | 28 | 14 | 9 | 7 | 7 | 6 | 6.5 | 53.9 | 46.0 | 46.0 | 46.0 | 7 | 13 | 56.0 | 65.0 | 7 | 13 | 38.0 | 40.0 | 7 | 7 | 5 | 6 | 44.9 | 132 | 144 | 156 | 7 | 6 | 50.0 | 60.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | |
| 38 FT | 26 | 29 | 15 | 9 | 7 | 6.5 | 6 | 6.5 | 54.6 | 50.0 | 50.0 | 50.0 | 7 | 13 | 56.0 | 65.0 | 7 | 13 | 39.0 | 41.0 | 7 | 6.5 | 6 | 8 | 48.1 | 133 | 145 | 157 | 7 | 6 | 50.0 | 60.0 | 5 | 12 | 6 | 8.5 | 0 | | | | | | | | | | |
| 40 FT | 27 | 29 | 15 | 9 | 7 | 6.5 | 6 | 7 | 53.4 | 51.0 | 51.0 | 51.0 | 7 | 13 | 56.0 | 64.0 | 7 | 13 | 38.0 | 40.0 | 7 | 6 | 6 | 8 | 46.9 | 133 | 145 | 157 | 8 | 7.5 | 56.0 | 66.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | |
| 42 FT | 28 | 30 | 15 | 9 | 7 | 6.5 | 6 | 6.5 | 53.4 | 52.0 | 52.0 | 52.0 | 7 | 12 | 56.0 | 64.0 | 7 | 12 | 38.0 | 39.0 | 7 | 6 | 6 | 8 | 47.0 | 134 | 146 | 158 | 8 | 7.5 | 56.0 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 44 FT | 29 | 31 | 15 | 9 | 7 | 6 | 6 | 6.5 | 53.4 | 53.0 | 53.0 | 53.0 | 7 | 12 | 56.0 | 63.0 | 7 | 12 | 37.0 | 39.0 | 7 | 6 | 6 | 7.5 | 47.1 | 135 | 147 | 159 | 8 | 7.5 | 56.0 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 46 FT | 30 | 32 | 15 | 9 | 7 | 6 | 6 | 6.5 | 53.5 | 54.0 | 54.0 | 54.0 | 7 | 12 | 55.0 | 63.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 7.5 | 47.4 | 136 | 148 | 160 | 8 | 7.5 | 56.0 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 48 FT | 31 | 33 | 15 | 9 | 7 | 6 | 6 | 6 | 53.5 | 55.0 | 55.0 | 55.0 | 7 | 12 | 55.0 | 62.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 7 | 47.5 | 137 | 149 | 161 | 8 | 7 | 56.0 | 66.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 50 FT | 31 | 34 | 16 | 9 | 8 | 7.5 | 6 | 6 | 54.4 | 55.0 | 55.0 | 55.0 | 7 | 12 | 55.0 | 62.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 7 | 47.9 | 138 | 150 | 162 | 8 | 7 | 56.0 | 67.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 12 FT OR 13 FT | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|--------------------|---------|------|----|-------|---------|------|----|------|---------|------|------------------|------|-----|--------------------|---------|------|----|-----|---------|------|---------|------------------------------|-----------|-----|----|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 HT=12'HT=13' | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 HT=12'HT=13' | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 10 | 10 | 5 | 6 | 5 | 7 | 63.8 | 34.0 | 34.0 | 5 | 12 | 118.5 | 87.5 | 5 | 12 | 32.0 | 35.0 | 5 | 7 | 6 | 6.5 | 89.1 | 150 | 162 | 6 | 7 | 55.0 | 57.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | |
| 2 FT | 14 | 10 | 10 | 10 | 5 | 6 | 5 | 7 | 63.8 | 34.0 | 34.0 | 5 | 12 | 118.5 | 87.5 | 5 | 12 | 31.0 | 33.0 | 5 | 7 | 6 | 6 | 79.6 | 150 | 162 | 6 | 6.5 | 54.0 | 56.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | |
| 4 FT | 11 | 11 | 10 | 10 | 5 | 6.5 | 5 | 6 | 63.8 | 31.0 | 31.0 | 5 | 12 | 118.5 | 89.0 | 5 | 12 | 34.0 | 35.0 | 5 | 6.5 | 6 | 6.5 | 76.3 | 151 | 163 | 6 | 6.5 | 53.0 | 57.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | |
| 6 FT | 11 | 11 | 10 | 10 | 5 | 6.5 | 5 | 6 | 71.3 | 31.0 | 31.0 | 6 | 16 | 65.0 | 69.0 | 6 | 16 | 35.0 | 36.0 | 5 | 6.5 | 6 | 6 | 69.1 | 151 | 163 | 6 | 6 | 51.0 | 56.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | |
| 8 FT | 11 | 12 | 10 | 10 | 5 | 6.5 | 6 | 7 | 65.4 | 31.0 | 35.0 | 6 | 15 | 57.0 | 60.0 | 6 | 15 | 34.0 | 35.0 | 5 | 6 | 6 | 6 | 66.4 | 152 | 164 | 6 | 6 | 50.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 10 FT | 12 | 13 | 10 | 10 | 5 | 6.5 | 6 | 7 | 62.9 | 36.0 | 36.0 | 6 | 15 | 55.0 | 58.0 | 6 | 15 | 33.0 | 34.0 | 5 | 6 | 6 | 6 | 63.8 | 153 | 165 | 6 | 6 | 49.0 | 56.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | |
| 12 FT | 13 | 14 | 11 | 10 | 5 | 6.5 | 6 | 7.5 | 61.1 | 33.0 | 37.0 | 6 | 14 | 53.0 | 57.0 | 6 | 14 | 33.0 | 34.0 | 6 | 8 | 6 | 7 | 62.0 | 154 | 166 | 6 | 6 | 49.0 | 56.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 14 FT | 14 | 15 | 11 | 10 | 5 | 6 | 6 | 7 | 59.9 | 38.0 | 38.0 | 6 | 14 | 51.0 | 57.0 | 6 | 14 | 32.0 | 34.0 | 6 | 7.5 | 6 | 6 | 60.9 | 155 | 167 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | |
| 16 FT | 15 | 16 | 12 | 10 | 6 | 8 | 6 | 7 | 65.0 | 39.0 | 39.0 | 6 | 14 | 56.0 | 62.0 | 6 | 14 | 38.0 | 40.0 | 6 | 7 | 6 | 7 | 59.9 | 156 | 168 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 18 FT | 16 | 17 | 12 | 10 | 6 | 8 | 6 | 6.5 | 64.1 | 40.0 | 40.0 | 6 | 13 | 55.0 | 62.0 | 6 | 13 | 38.0 | 40.0 | 6 | 7 | 6 | 6 | 59.1 | 157 | 169 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | |
| 20 FT | 17 | 18 | 13 | 10 | 6 | 7.5 | 6 | 6.5 | 63.8 | 41.0 | 41.0 | 6 | 13 | 55.0 | 61.0 | 6 | 13 | 38.0 | 40.0 | 6 | 6 | 6 | 7 | 58.5 | 158 | 170 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 22 FT | 18 | 20 | 13 | 10 | 6 | 7 | 6 | 6 | 63.3 | 42.0 | 42.0 | 6 | 13 | 54.0 | 61.0 | 6 | 13 | 38.0 | 40.0 | 6 | 6 | 6 | 6.5 | 58.4 | 160 | 172 | 6 | 6 | 48.0 | 56.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | |
| 24 FT | 19 | 21 | 14 | 10 | 6 | 6.5 | 6 | 6.5 | 63.1 | 39.0 | 43.0 | 6 | 12 | 54.0 | 61.0 | 6 | 12 | 37.0 | 40.0 | 7 | 8 | 6 | 7 | 58.0 | 161 | 173 | 7 | 7.5 | 51.0 | 60.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 26 FT | 20 | 22 | 14 | 10 | 6 | 6.5 | 6 | 6 | 62.8 | 44.0 | 44.0 | 6 | 12 | 53.0 | 61.0 | 6 | 12 | 37.0 | 40.0 | 7 | 7.5 | 6 | 6.5 | 57.6 | 162 | 174 | 7 | 7.5 | 51.0 | 60.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | |
| 28 FT | 21 | 23 | 15 | 10 | 6 | 6 | 6 | 6 | 62.9 | 45.0 | 45.0 | 6 | 12 | 53.0 | 61.0 | 6 | 12 | 37.0 | 40.0 | 7 | 7 | 6 | 7 | 57.4 | 163 | 175 | 7 | 7 | 51.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 30 FT | 23 | 25 | 15 | 10 | 7 | 7.5 | 6 | 6 | 62.8 | 47.0 | 47.0 | 7 | 15 | 57.0 | 65.0 | 7 | 15 | 40.0 | 42.0 | 7 | 7 | 6 | 7 | 57.5 | 165 | 177 | 7 | 6.5 | 51.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 32 FT | 23 | 26 | 16 | 10 | 7 | 7 | 6 | 6 | 63.1 | 47.0 | 47.0 | 7 | 14 | 57.0 | 65.0 | 7 | 14 | 41.0 | 43.0 | 7 | 7 | 6 | 7.5 | 57.5 | 166 | 178 | 7 | 6.5 | 51.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 34 FT | 24 | 27 | 16 | 10 | 7 | 7 | 7 | 7.5 | 68.1 | 48.0 | 48.0 | 7 | 14 | 57.0 | 65.0 | 7 | 14 | 40.0 | 42.0 | 7 | 7 | 6 | 7 | 57.5 | 167 | 179 | 7 | 6 | 51.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | |
| 36 FT | 25 | 28 | 17 | 10 | 7 | 7 | 6 | 6 | 63.6 | 49.0 | 49.0 | 7 | 14 | 57.0 | 64.0 | 7 | 14 | 40.0 | 42.0 | 7 | 7 | 6 | 7 | 57.8 | 168 | 180 | 7 | 6 | 51.0 | 60.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | |
| 38 FT | 26 | 29 | 17 | 10 | 7 | 7 | 7 | 7.5 | 68.6 | 50.0 | 50.0 | 7 | 13 | 57.0 | 64.0 | 7 | 13 | 39.0 | 41.0 | 7 | 6.5 | 6 | 7 | 57.9 | 169 | 181 | 7 | 6 | 51.0 | 60.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | |
| 40 FT | 27 | 29 | 17 | 10 | 7 | 6.5 | 7 | 8 | 66.8 | 51.0 | 51.0 | 7 | 13 | 56.0 | 63.0 | 7 | 13 | 38.0 | 40.0 | 7 | 6 | 6 | 7 | 55.9 | 169 | 181 | 8 | 7.5 | 57.0 | 66.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | |
| 42 FT | 28 | 30 | 17 | 10 | 7 | 6.5 | 7 | 7 | 66.9 | 52.0 | 52.0 | 7 | 12 | 56.0 | 63.0 | 7 | 12 | 38.0 | 39.0 | 7 | 6 | 6 | 7 | 56.0 | 170 | 182 | 8 | 7.5 | 57.0 | 66.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | |
| 44 FT | 29 | 31 | 18 | 10 | 7 | 6 | 7 | 7.5 | 67.8 | 53.0 | 53.0 | 7 | 12 | 56.0 | 62.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 6.5 | 56.4 | 171 | 183 | 8 | 7.5 | 57.0 | 66.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | |
| 46 FT | 29 | 32 | 19 | 10 | 7 | 6 | 7 | 7.5 | 68.5 | 53.0 | 53.0 | 7 | 12 | 56.0 | 62.0 | 7 | 12 | 38.0 | 39.0 | 7 | 6 | 6 | 6.5 | 56.8 | 172 | 184 | 8 | 7 | 57.0 | 67.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | |
| 48 FT | 30 | 33 | 19 | 10 | 7 | 6 | 7 | 7 | 68.5 | 54.0 | 54.0 | 7 | 12 | 56.0 | 61.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 6.5 | 56.9 | 173 | 185 | 8 | 7 | 57.0 | 67.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | |
| 50 FT | 31 | 34 | 19 | 10 | 7 | 6 | 7 | 6.5 | 68.6 | 55.0 | 55.0 | 7 | 12 | 56.0 | 61.0 | 7 | 12 | 37.0 | 38.0 | 7 | 6 | 6 | 6.5 | 57.3 | 174 | 186 | 8 | 7 | 57.0 | 67.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | |

| SPAN (S) = 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|------|-------|---------|------|------|------|---------|------|------------------|------|------|------|---------|--------|------|------|---------|------------------------------|---------|------|------|------|----|--|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=14' | HT=15' | | | | | | | | | | | | | | HT=14' | HT=15' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 11 | 10 | 12 | 5 | 6 | 6 | 7.5 | 64.0 | 34.0 | 38.0 | 5 | 12 | 119.5 | 88.5 | 5 | 12 | 32.0 | 35.0 | 5 | 7 | 6 | 6 | 95.5 | 175 | 187 | 5 | 6 | 55.0 | 55.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 14 | 12 | 10 | 12 | 5 | 6 | 6 | 7 | 64.0 | 34.0 | 38.0 | 5 | 12 | 119.5 | 88.5 | 5 | 12 | 31.0 | 34.0 | 5 | 7 | 6 | 6 | 95.5 | 176 | 188 | 5 | 6 | 54.0 | 55.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 10 | 11 | 12 | 12 | 5 | 6 | 6 | 7.5 | 68.3 | 34.0 | 34.0 | 6 | 15 | 121.5 | 77.0 | 6 | 15 | 37.0 | 37.0 | 5 | 6.5 | 6 | 6 | 86.8 | 175 | 187 | 6 | 6.5 | 55.0 | 57.0 | 5 | 11 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 10 | 12 | 12 | 12 | 5 | 6.5 | 6 | 7 | 80.0 | 34.0 | 34.0 | 6 | 15 | 61.0 | 61.0 | 6 | 15 | 35.0 | 35.0 | 5 | 6 | 6 | 6.5 | 83.1 | 176 | 188 | 6 | 6.5 | 53.0 | 57.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 12 | 12 | 12 | 5 | 7 | 6 | 7.5 | 76.8 | 35.0 | 35.0 | 6 | 15 | 58.0 | 59.0 | 6 | 15 | 35.0 | 35.0 | 5 | 6 | 6 | 6 | 77.1 | 176 | 188 | 6 | 6 | 52.0 | 55.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 13 | 12 | 12 | 5 | 6.5 | 6 | 7.5 | 74.4 | 36.0 | 36.0 | 6 | 15 | 56.0 | 58.0 | 6 | 15 | 34.0 | 35.0 | 5 | 6 | 6 | 6 | 75.5 | 177 | 189 | 6 | 6 | 51.0 | 55.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 14 | 13 | 12 | 5 | 6.5 | 6 | 7.5 | 71.5 | 37.0 | 37.0 | 6 | 15 | 54.0 | 57.0 | 6 | 15 | 34.0 | 35.0 | 6 | 8 | 6 | 6 | 73.0 | 178 | 190 | 6 | 6 | 50.0 | 55.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 14 | 15 | 13 | 12 | 5 | 6 | 6 | 6.5 | 70.3 | 38.0 | 38.0 | 6 | 14 | 52.0 | 56.0 | 6 | 14 | 33.0 | 35.0 | 6 | 7.5 | 6 | 6 | 72.0 | 179 | 191 | 6 | 6 | 50.0 | 55.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 15 | 16 | 14 | 12 | 6 | 8 | 6 | 6.5 | 74.5 | 39.0 | 39.0 | 6 | 14 | 57.0 | 62.0 | 6 | 14 | 39.0 | 41.0 | 6 | 7 | 6 | 6.5 | 70.3 | 180 | 192 | 6 | 6 | 49.0 | 55.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 15 | 17 | 15 | 12 | 6 | 7.5 | 6 | 6.5 | 72.4 | 39.0 | 39.0 | 6 | 13 | 56.0 | 61.0 | 6 | 13 | 39.0 | 40.0 | 6 | 6.5 | 6 | 6.5 | 69.0 | 181 | 193 | 6 | 6 | 49.0 | 56.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 17 | 19 | 15 | 12 | 6 | 7.5 | 6 | 6 | 73.0 | 41.0 | 41.0 | 6 | 13 | 56.0 | 61.0 | 6 | 13 | 39.0 | 41.0 | 6 | 6 | 6 | 6 | 69.6 | 183 | 195 | 6 | 6 | 49.0 | 56.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 18 | 20 | 16 | 12 | 6 | 7 | 6 | 6.5 | 72.8 | 42.0 | 42.0 | 6 | 13 | 55.0 | 61.0 | 6 | 13 | 39.0 | 41.0 | 6 | 6 | 6 | 6 | 68.4 | 184 | 196 | 6 | 6 | 49.0 | 56.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 19 | 21 | 16 | 12 | 6 | 6.5 | 6 | 6 | 72.4 | 43.0 | 43.0 | 6 | 13 | 55.0 | 61.0 | 6 | 13 | 38.0 | 41.0 | 7 | 8 | 7 | 7.5 | 71.1 | 185 | 197 | 7 | 7.5 | 52.0 | 59.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 20 | 22 | 16 | 12 | 6 | 6.5 | 7 | 7.5 | 77.1 | 44.0 | 50.0 | 6 | 12 | 55.0 | 61.0 | 6 | 12 | 38.0 | 40.0 | 7 | 7.5 | 7 | 7 | 70.8 | 186 | 198 | 7 | 7.5 | 52.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 21 | 23 | 17 | 12 | 6 | 6 | 7 | 7.5 | 77.1 | 45.0 | 51.0 | 6 | 12 | 54.0 | 60.0 | 6 | 12 | 37.0 | 40.0 | 7 | 6.5 | 7 | 7.5 | 70.5 | 187 | 199 | 7 | 6.5 | 52.0 | 60.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 22 | 25 | 18 | 12 | 6 | 6 | 7 | 7.5 | 77.3 | 46.0 | 46.0 | 7 | 15 | 59.0 | 65.0 | 7 | 15 | 42.0 | 44.0 | 7 | 7 | 6 | 6 | 67.8 | 189 | 201 | 7 | 6.5 | 52.0 | 60.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 23 | 26 | 19 | 12 | 7 | 7.5 | 7 | 7.5 | 77.5 | 47.0 | 47.0 | 7 | 15 | 58.0 | 65.0 | 7 | 15 | 41.0 | 44.0 | 7 | 7 | 6 | 6 | 67.8 | 190 | 202 | 7 | 6.5 | 52.0 | 60.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 24 | 27 | 19 | 12 | 7 | 7.5 | 7 | 7 | 77.6 | 48.0 | 48.0 | 7 | 14 | 58.0 | 65.0 | 7 | 14 | 41.0 | 43.0 | 7 | 7 | 6 | 6 | 67.9 | 191 | 203 | 7 | 6 | 52.0 | 60.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 25 | 28 | 20 | 12 | 7 | 7 | 7 | 7.5 | 78.1 | 49.0 | 49.0 | 7 | 14 | 58.0 | 64.0 | 7 | 14 | 40.0 | 42.0 | 7 | 7 | 6 | 6 | 68.1 | 192 | 204 | 7 | 6 | 52.0 | 60.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 26 | 29 | 21 | 12 | 7 | 7 | 7 | 7.5 | 78.6 | 50.0 | 50.0 | 7 | 13 | 58.0 | 64.0 | 7 | 13 | 40.0 | 41.0 | 7 | 6.5 | 6 | 6 | 68.3 | 193 | 205 | 7 | 6 | 52.0 | 61.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 27 | 30 | 21 | 12 | 7 | 6.5 | 7 | 7.5 | 77.1 | 51.0 | 51.0 | 7 | 13 | 57.0 | 63.0 | 7 | 13 | 39.0 | 40.0 | 7 | 6.5 | 6 | 6 | 66.5 | 194 | 206 | 7 | 6 | 52.0 | 61.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 27 | 31 | 21 | 12 | 7 | 6 | 7 | 7 | 77.0 | 51.0 | 51.0 | 7 | 12 | 57.0 | 63.0 | 7 | 12 | 40.0 | 41.0 | 7 | 6.5 | 6 | 6 | 66.8 | 195 | 207 | 7 | 6 | 52.0 | 61.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 28 | 31 | 22 | 12 | 7 | 6.5 | 7 | 7 | 77.6 | 52.0 | 58.0 | 7 | 12 | 57.0 | 63.0 | 7 | 12 | 39.0 | 40.0 | 7 | 6 | 7 | 7.5 | 69.6 | 195 | 207 | 8 | 7.5 | 58.0 | 67.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 29 | 32 | 22 | 12 | 7 | 6 | 7 | 6.5 | 77.9 | 59.0 | 59.0 | 7 | 12 | 57.0 | 62.0 | 7 | 12 | 38.0 | 40.0 | 7 | 6 | 7 | 7.5 | 70.0 | 196 | 208 | 8 | 7.5 | 58.0 | 67.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 30 | 33 | 23 | 12 | 7 | 6 | 7 | 6.5 | 78.6 | 54.0 | 60.0 | 7 | 12 | 57.0 | 62.0 | 7 | 12 | 38.0 | 39.0 | 7 | 6 | 7 | 7.5 | 70.4 | 197 | 209 | 8 | 7 | 58.0 | 67.0 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 30 | 34 | 24 | 12 | 7 | 6 | 7 | 6.5 | 79.1 | 54.0 | 60.0 | 7 | 12 | 57.0 | 62.0 | 7 | 12 | 38.0 | 39.0 | 7 | 6 | 7 | 7 | 70.6 | 198 | 210 | 8 | 7 | 58.0 | 67.0 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|------|------|------|---------|------|------------------|------|------|------|---------|-------|-------|-------|---------|------|---------|------|------------------------------------|------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 9 | 8 | 8 | 5 | 6 | 5 | 8.5 | 65.8 | 34.0 | 34.0 | 34.0 | 5 | 12 | 125.5 | 92.5 | 5 | 12 | 34.0 | 38.0 | 5 | 7.5 | 6 | 6 | 60.0 | 89 | 101 | 113 | 6 | 6 | 56.0 | 59.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 10 | 8 | 8 | 6 | 8 | 5 | 8 | 65.8 | 31.0 | 35.0 | 35.0 | 6 | 16 | 129.5 | 99.5 | 6 | 16 | 40.0 | 44.0 | 5 | 7 | 6 | 6.5 | 55.5 | 90 | 102 | 114 | 6 | 6 | 54.0 | 59.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 10 | 8 | 8 | 6 | 8 | 6 | 7 | 56.4 | 31.0 | 35.0 | 35.0 | 6 | 14 | 77.0 | 97.0 | 6 | 14 | 38.0 | 40.0 | 5 | 7 | 6 | 6 | 49.5 | 90 | 102 | 114 | 7 | 6.5 | 57.0 | 62.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 11 | 8 | 8 | 6 | 8.5 | 6 | 7 | 49.0 | 31.0 | 31.0 | 35.0 | 6 | 13 | 63.0 | 75.0 | 6 | 13 | 35.0 | 37.0 | 5 | 6.5 | 6 | 7 | 45.9 | 91 | 103 | 115 | 7 | 7 | 55.0 | 62.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 12 | 8 | 8 | 5 | 6 | 5 | 6 | 42.0 | 32.0 | 32.0 | 32.0 | 6 | 14 | 58.0 | 67.0 | 6 | 14 | 34.0 | 36.0 | 5 | 6 | 6 | 7 | 43.3 | 92 | 104 | 116 | 7 | 7 | 54.0 | 62.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 14 | 8 | 8 | 5 | 6 | 5 | 6 | 39.8 | 33.0 | 33.0 | 33.0 | 6 | 13 | 55.0 | 63.0 | 6 | 13 | 33.0 | 36.0 | 6 | 8 | 5 | 6.5 | 38.1 | 94 | 106 | 118 | 6 | 6 | 50.0 | 59.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 14 | 15 | 8 | 8 | 6 | 8 | 5 | 6 | 37.9 | 34.0 | 34.0 | 34.0 | 6 | 13 | 53.0 | 62.0 | 6 | 13 | 33.0 | 35.0 | 6 | 7.5 | 5 | 6.5 | 36.9 | 95 | 107 | 119 | 6 | 6 | 49.0 | 59.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 15 | 16 | 8 | 8 | 6 | 7.5 | 5 | 6 | 41.4 | 35.0 | 35.0 | 35.0 | 6 | 12 | 58.0 | 67.0 | 6 | 12 | 39.0 | 41.0 | 6 | 7 | 5 | 6.5 | 35.9 | 96 | 108 | 120 | 6 | 6 | 49.0 | 59.0 | 5 | 12 | 5 | 10.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 16 | 17 | 8 | 8 | 6 | 7.5 | 6 | 8 | 44.4 | 36.0 | 36.0 | 36.0 | 6 | 12 | 57.0 | 67.0 | 6 | 12 | 38.0 | 41.0 | 6 | 7 | 5 | 6.5 | 35.1 | 97 | 109 | 121 | 6 | 6 | 49.0 | 60.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 17 | 18 | 8 | 8 | 6 | 7 | 6 | 7.5 | 43.5 | 37.0 | 37.0 | 37.0 | 6 | 12 | 56.0 | 66.0 | 6 | 12 | 38.0 | 41.0 | 6 | 6.5 | 5 | 6 | 34.5 | 98 | 110 | 122 | 7 | 7 | 52.0 | 63.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 9 | 8 | 6 | 6.5 | 6 | 8 | 44.3 | 38.0 | 38.0 | 38.0 | 7 | 15 | 61.0 | 71.0 | 7 | 15 | 43.0 | 46.0 | 6 | 6 | 5 | 7 | 34.6 | 100 | 112 | 124 | 6 | 6 | 49.0 | 60.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 20 | 21 | 9 | 8 | 6 | 6.5 | 6 | 8 | 43.4 | 40.0 | 40.0 | 40.0 | 6 | 12 | 55.0 | 66.0 | 6 | 12 | 38.0 | 41.0 | 7 | 8 | 5 | 6.5 | 34.5 | 101 | 113 | 125 | 7 | 7 | 52.0 | 63.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 21 | 22 | 9 | 8 | 6 | 6 | 6 | 7.5 | 43.0 | 41.0 | 41.0 | 41.0 | 7 | 15 | 60.0 | 71.0 | 7 | 15 | 43.0 | 46.0 | 7 | 7.5 | 5 | 6 | 34.3 | 102 | 114 | 126 | 7 | 7 | 51.0 | 63.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 22 | 24 | 10 | 8 | 6 | 6 | 6 | 8 | 43.8 | 42.0 | 42.0 | 42.0 | 7 | 15 | 59.0 | 70.0 | 7 | 15 | 42.0 | 46.0 | 7 | 7 | 5 | 6.5 | 34.5 | 104 | 116 | 128 | 7 | 7 | 51.0 | 63.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 23 | 25 | 11 | 8 | 7 | 7 | 5 | 6 | 40.5 | 43.0 | 43.0 | 43.0 | 7 | 14 | 59.0 | 70.0 | 7 | 14 | 42.0 | 46.0 | 7 | 6.5 | 5 | 7 | 34.9 | 105 | 117 | 129 | 7 | 6.5 | 51.0 | 63.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 25 | 26 | 11 | 8 | 7 | 7 | 5 | 6 | 40.0 | 45.0 | 45.0 | 45.0 | 7 | 14 | 59.0 | 70.0 | 7 | 14 | 41.0 | 44.0 | 7 | 6.5 | 5 | 6.5 | 34.9 | 106 | 118 | 130 | 7 | 6.5 | 51.0 | 63.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 26 | 27 | 11 | 8 | 7 | 7 | 5 | 6 | 39.8 | 46.0 | 46.0 | 46.0 | 7 | 13 | 59.0 | 69.0 | 7 | 13 | 40.0 | 43.0 | 7 | 6 | 5 | 6 | 34.8 | 107 | 119 | 131 | 7 | 6 | 51.0 | 63.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 27 | 29 | 11 | 8 | 7 | 6.5 | 6 | 8 | 43.9 | 47.0 | 47.0 | 51.0 | 7 | 13 | 58.0 | 69.0 | 7 | 13 | 40.0 | 42.0 | 7 | 6.5 | 6 | 7.5 | 37.9 | 109 | 121 | 133 | 8 | 7.5 | 57.0 | 69.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 28 | 30 | 11 | 8 | 7 | 6.5 | 6 | 7.5 | 43.9 | 52.0 | 52.0 | 52.0 | 7 | 12 | 58.0 | 68.0 | 7 | 12 | 40.0 | 42.0 | 7 | 6 | 6 | 7 | 37.9 | 110 | 122 | 134 | 8 | 7.5 | 57.0 | 69.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 29 | 31 | 11 | 8 | 7 | 6 | 6 | 6.5 | 43.9 | 53.0 | 53.0 | 53.0 | 7 | 12 | 58.0 | 68.0 | 7 | 12 | 39.0 | 41.0 | 7 | 6 | 6 | 7 | 38.0 | 111 | 123 | 135 | 8 | 7 | 57.0 | 69.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 30 | 32 | 12 | 8 | 7 | 6 | 6 | 7.5 | 44.8 | 54.0 | 54.0 | 54.0 | 7 | 12 | 58.0 | 68.0 | 7 | 12 | 38.0 | 40.0 | 7 | 6 | 6 | 7.5 | 38.5 | 112 | 124 | 136 | 8 | 7 | 57.0 | 70.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 31 | 33 | 12 | 8 | 8 | 7.5 | 6 | 7.5 | 43.8 | 55.0 | 55.0 | 55.0 | 8 | 15 | 66.0 | 75.0 | 8 | 15 | 46.0 | 47.0 | 7 | 6 | 6 | 7 | 37.6 | 113 | 125 | 137 | 8 | 7 | 57.0 | 69.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 32 | 34 | 12 | 8 | 8 | 7.5 | 6 | 7 | 43.9 | 56.0 | 56.0 | 56.0 | 8 | 14 | 65.0 | 74.0 | 8 | 14 | 45.0 | 47.0 | 7 | 6 | 6 | 7 | 37.8 | 114 | 126 | 138 | 8 | 7 | 57.0 | 69.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 32 | 35 | 12 | 8 | 8 | 7 | 6 | 7 | 43.9 | 56.0 | 56.0 | 56.0 | 8 | 14 | 65.0 | 74.0 | 8 | 14 | 46.0 | 47.0 | 7 | 6 | 6 | 6.5 | 37.8 | 115 | 127 | 139 | 8 | 7 | 57.0 | 69.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 33 | 35 | 12 | 8 | 8 | 7 | 6 | 7 | 43.9 | 57.0 | 57.0 | 57.0 | 8 | 14 | 65.0 | 74.0 | 8 | 14 | 45.0 | 47.0 | 8 | 7 | 6 | 6.5 | 37.9 | 115 | 127 | 139 | 8 | 6.5 | 57.0 | 69.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 34 | 36 | 12 | 8 | 8 | 7 | 6 | 6.5 | 43.9 | 58.0 | 58.0 | 58.0 | 8 | 14 | 65.0 | 73.0 | 8 | 14 | 45.0 | 46.0 | 8 | 7 | 6 | 6.5 | 38.1 | 116 | 128 | 140 | 8 | 6.5 | 57.0 | 69.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|-------|-------|---------|------|------|------|------------------|------|---------|------|------|--------|--------|--------|---------|------|------|------|---------------------------------------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 9 | 10 | 5 | 6 | 5 | 7 | 66.6 | 34.0 | 34.0 | 34.0 | 5 | 12 | 126.5 | 93.5 | 5 | 12 | 35.0 | 38.0 | 5 | 7 | 6 | 6 | 81.5 | 126 | 138 | 150 | 6 | 6.5 | 57.0 | 60.0 | 5 | 12 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 10 | 10 | 10 | 6 | 8 | 5 | 7.5 | 67.3 | 35.0 | 35.0 | 35.0 | 6 | 16 | 130.5 | 100.5 | 6 | 16 | 41.0 | 44.0 | 5 | 7 | 6 | 6 | 70.1 | 126 | 138 | 150 | 6 | 6 | 56.0 | 58.0 | 5 | 12 | 5 | 9.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 10 | 10 | 10 | 6 | 8 | 5 | 6 | 72.3 | 31.0 | 31.0 | 31.0 | 6 | 15 | 82.0 | 97.0 | 6 | 15 | 38.0 | 39.0 | 5 | 7 | 6 | 6 | 64.6 | 126 | 138 | 150 | 7 | 6.5 | 58.0 | 61.0 | 5 | 9.5 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 11 | 10 | 10 | 5 | 6 | 5 | 6 | 60.5 | 31.0 | 31.0 | 31.0 | 6 | 14 | 64.0 | 71.0 | 6 | 14 | 36.0 | 37.0 | 5 | 6.5 | 6 | 6 | 61.0 | 127 | 139 | 151 | 7 | 6.5 | 57.0 | 61.0 | 5 | 12 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 13 | 10 | 10 | 5 | 6 | 5 | 6 | 56.8 | 32.0 | 32.0 | 32.0 | 6 | 14 | 60.0 | 64.0 | 6 | 14 | 35.0 | 36.0 | 5 | 6 | 6 | 6.5 | 59.1 | 129 | 141 | 153 | 6 | 6 | 52.0 | 59.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 14 | 10 | 10 | 5 | 6 | 6 | 7 | 56.9 | 33.0 | 33.0 | 37.0 | 6 | 13 | 57.0 | 62.0 | 6 | 13 | 34.0 | 36.0 | 6 | 8 | 6 | 6.5 | 56.8 | 130 | 142 | 154 | 6 | 6 | 51.0 | 59.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 14 | 15 | 10 | 10 | 5 | 6 | 6 | 6.5 | 54.6 | 34.0 | 34.0 | 38.0 | 6 | 13 | 55.0 | 61.0 | 6 | 13 | 34.0 | 36.0 | 6 | 7.5 | 6 | 6.5 | 54.9 | 131 | 143 | 155 | 6 | 6 | 51.0 | 59.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 15 | 16 | 10 | 10 | 6 | 8 | 6 | 6.5 | 58.9 | 35.0 | 35.0 | 39.0 | 6 | 13 | 60.0 | 66.0 | 6 | 13 | 39.0 | 42.0 | 6 | 7 | 6 | 6 | 53.5 | 132 | 144 | 156 | 6 | 6 | 50.0 | 59.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 16 | 17 | 11 | 10 | 6 | 7.5 | 6 | 7 | 58.0 | 36.0 | 36.0 | 40.0 | 6 | 12 | 58.0 | 66.0 | 6 | 12 | 39.0 | 42.0 | 6 | 7 | 6 | 7.5 | 52.5 | 133 | 145 | 157 | 6 | 6 | 50.0 | 59.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 17 | 18 | 12 | 10 | 6 | 7.5 | 6 | 7 | 57.9 | 37.0 | 37.0 | 41.0 | 6 | 12 | 58.0 | 66.0 | 6 | 12 | 39.0 | 42.0 | 6 | 6 | 6 | 7.5 | 52.0 | 134 | 146 | 158 | 7 | 7 | 53.0 | 62.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 12 | 10 | 6 | 7 | 6 | 6.5 | 57.3 | 38.0 | 38.0 | 42.0 | 6 | 12 | 57.0 | 65.0 | 6 | 12 | 39.0 | 42.0 | 6 | 6 | 6 | 7.5 | 51.5 | 136 | 148 | 160 | 6 | 6 | 50.0 | 60.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 19 | 21 | 12 | 10 | 6 | 6 | 6 | 6.5 | 56.8 | 39.0 | 39.0 | 43.0 | 7 | 15 | 62.0 | 70.0 | 7 | 15 | 44.0 | 47.0 | 7 | 8 | 6 | 7 | 51.0 | 137 | 149 | 161 | 7 | 7 | 53.0 | 63.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 21 | 22 | 13 | 10 | 6 | 6 | 6 | 6.5 | 56.9 | 41.0 | 41.0 | 45.0 | 6 | 12 | 56.0 | 65.0 | 6 | 12 | 38.0 | 42.0 | 7 | 7 | 6 | 7.5 | 51.1 | 138 | 150 | 162 | 7 | 7 | 53.0 | 63.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 22 | 24 | 13 | 10 | 6 | 6 | 6 | 6.5 | 56.6 | 42.0 | 42.0 | 46.0 | 7 | 15 | 60.0 | 70.0 | 7 | 15 | 43.0 | 46.0 | 7 | 7 | 6 | 7.5 | 50.9 | 140 | 152 | 164 | 7 | 7 | 53.0 | 63.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 23 | 25 | 14 | 10 | 7 | 7.5 | 6 | 6.5 | 57.0 | 43.0 | 43.0 | 47.0 | 7 | 15 | 60.0 | 69.0 | 7 | 15 | 43.0 | 46.0 | 7 | 6.5 | 6 | 8 | 51.0 | 141 | 153 | 165 | 7 | 6.5 | 53.0 | 63.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 24 | 26 | 14 | 10 | 7 | 7 | 6 | 6.5 | 56.6 | 44.0 | 44.0 | 48.0 | 7 | 14 | 60.0 | 69.0 | 7 | 14 | 42.0 | 45.0 | 7 | 6.5 | 6 | 7.5 | 50.8 | 142 | 154 | 166 | 7 | 6.5 | 53.0 | 63.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 26 | 28 | 14 | 10 | 7 | 7 | 6 | 6 | 56.5 | 46.0 | 46.0 | 50.0 | 7 | 13 | 59.0 | 69.0 | 7 | 13 | 41.0 | 43.0 | 7 | 6.5 | 6 | 7.5 | 50.8 | 144 | 156 | 168 | 7 | 6 | 53.0 | 63.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 27 | 29 | 15 | 10 | 7 | 6.5 | 6 | 6.5 | 57.1 | 51.0 | 51.0 | 51.0 | 7 | 13 | 59.0 | 68.0 | 7 | 13 | 40.0 | 43.0 | 7 | 6.5 | 6 | 8 | 51.1 | 145 | 157 | 169 | 8 | 7.5 | 59.0 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 28 | 30 | 15 | 10 | 7 | 6.5 | 6 | 6 | 57.1 | 52.0 | 52.0 | 52.0 | 7 | 12 | 59.0 | 68.0 | 7 | 12 | 40.0 | 42.0 | 7 | 6 | 6 | 7.5 | 51.1 | 146 | 158 | 170 | 8 | 7.5 | 59.0 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 29 | 31 | 16 | 10 | 7 | 6 | 6 | 6 | 57.8 | 53.0 | 53.0 | 53.0 | 7 | 12 | 59.0 | 68.0 | 7 | 12 | 39.0 | 41.0 | 7 | 6 | 6 | 7.5 | 51.6 | 147 | 159 | 171 | 8 | 7 | 59.0 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 30 | 32 | 16 | 10 | 7 | 6 | 6 | 6 | 57.8 | 54.0 | 54.0 | 54.0 | 7 | 12 | 59.0 | 67.0 | 7 | 12 | 39.0 | 40.0 | 7 | 6 | 6 | 7.5 | 51.6 | 148 | 160 | 172 | 8 | 7 | 59.0 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 30 | 33 | 17 | 10 | 7 | 6 | 6 | 6 | 58.5 | 54.0 | 54.0 | 54.0 | 7 | 12 | 59.0 | 67.0 | 7 | 12 | 40.0 | 41.0 | 7 | 6 | 6 | 7 | 51.9 | 149 | 161 | 173 | 8 | 7 | 59.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 31 | 34 | 17 | 10 | 8 | 7.5 | 6 | 6 | 57.4 | 55.0 | 55.0 | 55.0 | 8 | 15 | 66.0 | 74.0 | 8 | 15 | 47.0 | 48.0 | 7 | 6 | 6 | 7 | 50.8 | 150 | 162 | 174 | 8 | 7 | 59.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 32 | 35 | 17 | 10 | 8 | 7.5 | 6 | 6 | 57.4 | 56.0 | 56.0 | 56.0 | 8 | 14 | 66.0 | 74.0 | 8 | 14 | 46.0 | 48.0 | 8 | 7.5 | 6 | 6.5 | 50.9 | 151 | 163 | 175 | 8 | 7 | 59.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 33 | 36 | 17 | 10 | 8 | 7 | 6 | 6 | 57.4 | 57.0 | 57.0 | 57.0 | 8 | 14 | 66.0 | 73.0 | 8 | 14 | 46.0 | 47.0 | 8 | 7.5 | 6 | 6.5 | 51.1 | 152 | 164 | 176 | 8 | 6.5 | 59.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 34 | 36 | 18 | 10 | 8 | 7 | 6 | 6 | 58.1 | 58.0 | 58.0 | 58.0 | 8 | 14 | 66.0 | 73.0 | 8 | 14 | 46.0 | 47.0 | 8 | 6.5 | 6 | 6.5 | 51.5 | 152 | 164 | 176 | 8 | 6.5 | 59.0 | 70.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 13 FT OR 14 FT | | | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|------|-------|---------|------|------|------|---------|------|------------------|------|------|-------|---------|--------|------|------|---------|------|---------|------------------------------|-----------|------|-----|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=13' | HT=14' | | | | | | | | | | | | | | HT=13' | HT=14' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 11 | 10 | 11 | 5 | 6 | 5 | 6 | 67.5 | 34.0 | 34.0 | 5 | 12 | 127.5 | 94.5 | 5 | 12 | 35.0 | 38.0 | 5 | 7 | 6 | 6.5 | 100.1 | 163 | 175 | 5 | 6 | 56.0 | 58.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 11 | 10 | 11 | 6 | 8 | 5 | 6 | 67.5 | 35.0 | 35.0 | 6 | 16 | 131.5 | 101.5 | 6 | 16 | 41.0 | 44.0 | 5 | 6.5 | 6 | 6 | 88.9 | 163 | 175 | 6 | 6.5 | 57.0 | 60.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 11 | 11 | 11 | 6 | 8 | 5 | 6 | 68.1 | 31.0 | 31.0 | 6 | 15 | 127.5 | 92.0 | 6 | 15 | 38.0 | 39.0 | 5 | 6.5 | 6 | 6 | 78.6 | 163 | 175 | 6 | 6 | 56.0 | 60.0 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 12 | 11 | 11 | 5 | 6 | 6 | 7.5 | 75.9 | 31.0 | 35.0 | 6 | 14 | 65.0 | 69.0 | 6 | 14 | 36.0 | 37.0 | 5 | 6 | 6 | 6.5 | 74.6 | 164 | 176 | 6 | 6 | 54.0 | 59.0 | 5 | 12 | 5 | 7.5 | 12 | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 13 | 11 | 11 | 5 | 6 | 6 | 7.5 | 70.1 | 32.0 | 36.0 | 6 | 14 | 61.0 | 64.0 | 6 | 14 | 35.0 | 36.0 | 5 | 6 | 6 | 6.5 | 70.9 | 165 | 177 | 6 | 6 | 53.0 | 59.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 14 | 12 | 11 | 5 | 6 | 6 | 7.5 | 65.9 | 36.0 | 36.0 | 6 | 12 | 58.0 | 61.0 | 6 | 12 | 35.0 | 35.0 | 6 | 8 | 6 | 7 | 67.9 | 166 | 178 | 6 | 6 | 52.0 | 59.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 15 | 12 | 11 | 6 | 8 | 6 | 7 | 64.4 | 37.0 | 37.0 | 6 | 12 | 56.0 | 60.0 | 6 | 12 | 34.0 | 35.0 | 6 | 7.5 | 6 | 7 | 66.3 | 167 | 179 | 6 | 6 | 52.0 | 59.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | |
| 14 FT | 15 | 16 | 12 | 11 | 6 | 8 | 6 | 6.5 | 69.9 | 39.0 | 39.0 | 6 | 13 | 60.0 | 66.0 | 6 | 13 | 40.0 | 42.0 | 6 | 7 | 6 | 6 | 64.9 | 168 | 180 | 6 | 6 | 51.0 | 59.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | |
| 16 FT | 16 | 17 | 13 | 11 | 6 | 8 | 6 | 6.5 | 68.9 | 40.0 | 40.0 | 6 | 13 | 59.0 | 65.0 | 6 | 13 | 40.0 | 42.0 | 6 | 7 | 6 | 6.5 | 63.8 | 169 | 181 | 6 | 6 | 51.0 | 59.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 18 FT | 17 | 19 | 14 | 11 | 6 | 7.5 | 6 | 6.5 | 68.3 | 41.0 | 41.0 | 6 | 12 | 58.0 | 65.0 | 6 | 12 | 40.0 | 42.0 | 6 | 6 | 6 | 6 | 6.5 | 63.5 | 171 | 183 | 6 | 6 | 51.0 | 60.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 14 | 11 | 6 | 7 | 6 | 6 | 67.5 | 42.0 | 42.0 | 6 | 12 | 58.0 | 65.0 | 6 | 12 | 39.0 | 42.0 | 6 | 6 | 6 | 6 | 6.5 | 62.8 | 172 | 184 | 6 | 6 | 51.0 | 60.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | |
| 22 FT | 19 | 21 | 14 | 11 | 6 | 6.5 | 6 | 6 | 66.9 | 43.0 | 43.0 | 6 | 12 | 57.0 | 65.0 | 6 | 12 | 39.0 | 42.0 | 7 | 8 | 6 | 6 | 62.1 | 173 | 185 | 7 | 7 | 54.0 | 63.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | |
| 24 FT | 20 | 22 | 16 | 11 | 6 | 6 | 6 | 6 | 67.3 | 44.0 | 44.0 | 7 | 15 | 62.0 | 69.0 | 7 | 15 | 44.0 | 47.0 | 7 | 7 | 6 | 6 | 6.5 | 61.8 | 174 | 186 | 7 | 7 | 54.0 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 26 FT | 22 | 24 | 16 | 11 | 6 | 6 | 6 | 6 | 67.1 | 46.0 | 46.0 | 7 | 15 | 61.0 | 69.0 | 7 | 15 | 43.0 | 46.0 | 7 | 7 | 6 | 7 | 61.8 | 176 | 188 | 7 | 7 | 54.0 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | |
| 28 FT | 23 | 25 | 16 | 11 | 7 | 7.5 | 7 | 8 | 71.6 | 47.0 | 47.0 | 7 | 15 | 61.0 | 69.0 | 7 | 15 | 43.0 | 46.0 | 7 | 6.5 | 6 | 6 | 6.5 | 61.4 | 177 | 189 | 7 | 6.5 | 54.0 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | |
| 30 FT | 24 | 26 | 16 | 11 | 7 | 7.5 | 7 | 7 | 71.3 | 48.0 | 48.0 | 7 | 14 | 60.0 | 69.0 | 7 | 14 | 42.0 | 45.0 | 7 | 6.5 | 6 | 6 | 61.0 | 178 | 190 | 7 | 6.5 | 54.0 | 63.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | |
| 32 FT | 25 | 28 | 17 | 11 | 7 | 7 | 7 | 7.5 | 71.6 | 49.0 | 49.0 | 7 | 14 | 60.0 | 68.0 | 7 | 14 | 42.0 | 45.0 | 7 | 6.5 | 6 | 6 | 6.5 | 61.1 | 180 | 192 | 7 | 6 | 54.0 | 64.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 34 FT | 26 | 29 | 17 | 11 | 7 | 6.5 | 7 | 6.5 | 71.4 | 50.0 | 50.0 | 7 | 13 | 60.0 | 68.0 | 7 | 13 | 42.0 | 44.0 | 7 | 6.5 | 6 | 6 | 6.5 | 61.0 | 181 | 193 | 8 | 7.5 | 60.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 27 | 30 | 18 | 11 | 7 | 6.5 | 7 | 7 | 72.0 | 51.0 | 51.0 | 7 | 13 | 60.0 | 68.0 | 7 | 13 | 41.0 | 43.0 | 7 | 6 | 6 | 6 | 6.5 | 61.3 | 182 | 194 | 8 | 7.5 | 60.0 | 70.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | |
| 38 FT | 28 | 31 | 19 | 11 | 7 | 6.5 | 7 | 7.5 | 72.5 | 52.0 | 52.0 | 7 | 12 | 59.0 | 67.0 | 7 | 12 | 41.0 | 43.0 | 7 | 6 | 6 | 6 | 6.5 | 61.5 | 183 | 195 | 8 | 7 | 60.0 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | |
| 40 FT | 29 | 32 | 19 | 11 | 7 | 6 | 7 | 6.5 | 72.6 | 53.0 | 53.0 | 7 | 12 | 59.0 | 67.0 | 7 | 12 | 40.0 | 42.0 | 7 | 6 | 6 | 6 | 61.5 | 184 | 196 | 8 | 7 | 60.0 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 42 FT | 30 | 33 | 20 | 11 | 7 | 6 | 7 | 7 | 73.3 | 54.0 | 54.0 | 7 | 12 | 59.0 | 66.0 | 7 | 12 | 39.0 | 41.0 | 7 | 6 | 6 | 6 | 61.9 | 185 | 197 | 8 | 7 | 60.0 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 44 FT | 31 | 34 | 20 | 11 | 8 | 7.5 | 7 | 7 | 71.6 | 55.0 | 55.0 | 8 | 15 | 67.0 | 73.0 | 8 | 15 | 47.0 | 48.0 | 7 | 6 | 6 | 6 | 60.1 | 186 | 198 | 8 | 7 | 60.0 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 46 FT | 32 | 35 | 20 | 11 | 8 | 7.5 | 7 | 6.5 | 71.6 | 56.0 | 56.0 | 8 | 15 | 67.0 | 73.0 | 8 | 15 | 46.0 | 48.0 | 8 | 7.5 | 6 | 6 | 60.3 | 187 | 199 | 8 | 7 | 60.0 | 70.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 48 FT | 32 | 36 | 21 | 11 | 8 | 7 | 7 | 7 | 72.4 | 56.0 | 56.0 | 8 | 14 | 67.0 | 73.0 | 8 | 14 | 47.0 | 48.0 | 8 | 7.5 | 6 | 6 | 60.5 | 188 | 200 | 8 | 6.5 | 60.0 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | |
| 50 FT | 33 | 36 | 22 | 11 | 8 | 7 | 7 | 7 | 73.1 | 57.0 | 63.0 | 8 | 14 | 66.0 | 72.0 | 8 | 14 | 46.0 | 47.0 | 8 | 6.5 | 7 | 7.5 | 63.8 | 188 | 200 | 8 | 6.5 | 60.0 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | |

| SPAN (S) = 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 15 FT OR 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|---------|------|------|-------|---------|------|------|------|---------|------|------------------|------|------|-------|---------|--------|------|------|---------|------------------------------|---------|------|------|------|----|--|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | SIZE | SPA. | C5 | Q8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=15' | HT=16' | | | | | | | | | | | | | | HT=15' | HT=16' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 11 | 12 | 13 | 5 | 6 | 5 | 6 | 69.0 | 34.0 | 34.0 | 5 | 12 | 128.5 | 95.5 | 5 | 12 | 35.0 | 37.0 | 5 | 6.5 | 6 | 6.5 | 103.3 | 187 | 199 | 6 | 7 | 60.0 | 61.0 | 5 | 10.5 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 11 | 12 | 13 | 6 | 8 | 6 | 8 | 72.0 | 35.0 | 39.0 | 6 | 16 | 135.5 | 102.5 | 6 | 16 | 41.0 | 44.0 | 5 | 6.5 | 6 | 6 | 95.4 | 187 | 199 | 6 | 6.5 | 58.0 | 59.0 | 5 | 12 | 5 | 7 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 11 | 12 | 13 | 6 | 8 | 6 | 7 | 72.0 | 35.0 | 35.0 | 6 | 15 | 130.5 | 82.0 | 6 | 15 | 39.0 | 39.0 | 5 | 6.5 | 7 | 6 | 92.5 | 187 | 199 | 6 | 6 | 57.0 | 59.0 | 5 | 12 | 5 | 6.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 11 | 12 | 12 | 13 | 5 | 6 | 6 | 6.5 | 90.4 | 35.0 | 35.0 | 6 | 14 | 65.0 | 66.0 | 6 | 14 | 37.0 | 37.0 | 5 | 6 | 7 | 6 | 88.9 | 188 | 200 | 6 | 6 | 56.0 | 59.0 | 5 | 12 | 5 | 6.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 11 | 13 | 13 | 13 | 5 | 6 | 6 | 6.5 | 78.1 | 35.0 | 35.0 | 6 | 13 | 60.0 | 62.0 | 6 | 13 | 36.0 | 36.0 | 5 | 6 | 6 | 6 | 82.4 | 189 | 201 | 6 | 6 | 55.0 | 59.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 12 | 14 | 13 | 13 | 5 | 6 | 6 | 6.5 | 76.0 | 36.0 | 36.0 | 6 | 13 | 58.0 | 60.0 | 6 | 13 | 35.0 | 36.0 | 6 | 8 | 6 | 6 | 80.4 | 190 | 202 | 6 | 6 | 54.0 | 59.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 13 | 15 | 14 | 13 | 5 | 6 | 6 | 6.5 | 73.3 | 37.0 | 37.0 | 6 | 12 | 57.0 | 59.0 | 6 | 12 | 35.0 | 36.0 | 6 | 7.5 | 6 | 6 | 77.5 | 191 | 203 | 6 | 6 | 53.0 | 59.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 14 | 16 | 14 | 13 | 6 | 8 | 6 | 6 | 72.3 | 38.0 | 38.0 | 6 | 12 | 55.0 | 59.0 | 6 | 12 | 35.0 | 36.0 | 6 | 7 | 6 | 6 | 76.3 | 192 | 204 | 7 | 7 | 55.0 | 62.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 15 | 17 | 16 | 13 | 6 | 7.5 | 6 | 6.5 | 76.6 | 39.0 | 39.0 | 6 | 12 | 60.0 | 64.0 | 6 | 12 | 41.0 | 42.0 | 6 | 6.5 | 6 | 6.5 | 73.3 | 193 | 205 | 7 | 7 | 55.0 | 62.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 16 | 19 | 16 | 13 | 6 | 7 | 6 | 6 | 76.3 | 40.0 | 40.0 | 6 | 12 | 59.0 | 64.0 | 6 | 12 | 40.0 | 42.0 | 6 | 6 | 6 | 6 | 74.1 | 195 | 207 | 6 | 6 | 52.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 18 | 20 | 16 | 13 | 6 | 7 | 6 | 6 | 76.8 | 42.0 | 42.0 | 6 | 12 | 59.0 | 64.0 | 6 | 12 | 40.0 | 42.0 | 6 | 6 | 6 | 6 | 73.0 | 196 | 208 | 6 | 6 | 52.0 | 60.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 19 | 21 | 17 | 13 | 6 | 6.5 | 6 | 6 | 76.4 | 43.0 | 43.0 | 6 | 12 | 58.0 | 64.0 | 6 | 12 | 40.0 | 42.0 | 7 | 7.5 | 7 | 7.5 | 75.1 | 197 | 209 | 7 | 7 | 55.0 | 63.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 20 | 23 | 17 | 13 | 6 | 6.5 | 7 | 7.5 | 81.1 | 44.0 | 50.0 | 6 | 12 | 58.0 | 64.0 | 6 | 12 | 40.0 | 42.0 | 7 | 7 | 7 | 7 | 75.4 | 199 | 211 | 7 | 7 | 55.0 | 63.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 22 | 24 | 18 | 13 | 6 | 6 | 7 | 7.5 | 81.5 | 46.0 | 52.0 | 7 | 15 | 62.0 | 69.0 | 7 | 15 | 44.0 | 46.0 | 7 | 7 | 7 | 7.5 | 74.9 | 200 | 212 | 7 | 7 | 55.0 | 63.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 23 | 25 | 18 | 13 | 7 | 7.5 | 7 | 6.5 | 81.3 | 47.0 | 53.0 | 7 | 15 | 62.0 | 69.0 | 7 | 15 | 43.0 | 46.0 | 7 | 6.5 | 7 | 6.5 | 74.6 | 201 | 213 | 7 | 6.5 | 55.0 | 63.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 24 | 26 | 19 | 13 | 7 | 7.5 | 7 | 7 | 81.3 | 48.0 | 54.0 | 7 | 14 | 61.0 | 69.0 | 7 | 14 | 43.0 | 46.0 | 7 | 6.5 | 7 | 7 | 74.4 | 202 | 214 | 7 | 6.5 | 55.0 | 63.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 25 | 28 | 20 | 13 | 7 | 7 | 7 | 7 | 81.4 | 49.0 | 55.0 | 7 | 14 | 61.0 | 68.0 | 7 | 14 | 42.0 | 45.0 | 7 | 6.5 | 7 | 7.5 | 74.6 | 204 | 216 | 7 | 6 | 55.0 | 64.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 26 | 29 | 21 | 13 | 7 | 7 | 7 | 7 | 81.6 | 50.0 | 56.0 | 7 | 13 | 61.0 | 68.0 | 7 | 13 | 42.0 | 44.0 | 7 | 6.5 | 7 | 7.5 | 74.5 | 205 | 217 | 8 | 7.5 | 61.0 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 27 | 30 | 22 | 13 | 7 | 6.5 | 7 | 7 | 82.0 | 57.0 | 57.0 | 7 | 13 | 60.0 | 68.0 | 7 | 13 | 42.0 | 44.0 | 7 | 6 | 7 | 7.5 | 74.8 | 206 | 218 | 8 | 7.5 | 61.0 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 28 | 31 | 22 | 13 | 7 | 6.5 | 7 | 6.5 | 82.1 | 58.0 | 58.0 | 7 | 12 | 60.0 | 67.0 | 7 | 12 | 41.0 | 43.0 | 7 | 6 | 7 | 7 | 74.8 | 207 | 219 | 8 | 7 | 61.0 | 70.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 29 | 32 | 23 | 13 | 7 | 6 | 7 | 6.5 | 82.6 | 59.0 | 59.0 | 7 | 12 | 60.0 | 67.0 | 7 | 12 | 41.0 | 42.0 | 7 | 6 | 7 | 7 | 75.0 | 208 | 220 | 8 | 7 | 61.0 | 70.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 30 | 33 | 24 | 13 | 7 | 6 | 7 | 6.5 | 83.3 | 60.0 | 60.0 | 7 | 12 | 60.0 | 66.0 | 7 | 12 | 40.0 | 42.0 | 7 | 6 | 7 | 7 | 75.3 | 209 | 221 | 8 | 7 | 61.0 | 70.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 31 | 34 | 24 | 13 | 7 | 6 | 7 | 7 | 81.8 | 61.0 | 61.0 | 8 | 15 | 68.0 | 74.0 | 8 | 15 | 47.0 | 49.0 | 7 | 6 | 7 | 7 | 73.5 | 210 | 222 | 8 | 7 | 61.0 | 70.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 31 | 35 | 24 | 13 | 8 | 7.5 | 7 | 6 | 81.6 | 61.0 | 61.0 | 8 | 15 | 68.0 | 74.0 | 8 | 15 | 48.0 | 49.0 | 8 | 7.5 | 7 | 7 | 73.8 | 211 | 223 | 8 | 7 | 61.0 | 70.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 32 | 36 | 25 | 13 | 8 | 7.5 | 7 | 6 | 82.4 | 62.0 | 62.0 | 8 | 14 | 67.0 | 73.0 | 8 | 14 | 47.0 | 49.0 | 8 | 7.5 | 7 | 7 | 74.1 | 212 | 224 | 8 | 6.5 | 61.0 | 71.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 33 | 37 | 26 | 13 | 8 | 7 | 7 | 6 | 83.1 | 63.0 | 63.0 | 8 | 14 | 67.0 | 72.0 | 8 | 14 | 47.0 | 48.0 | 8 | 7.5 | 7 | 6.5 | 74.5 | 213 | 225 | 8 | 6.5 | 61.0 | 71.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 7 FT OR 8 FT OR 9 FT | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|-------|---------|-------|------|------|---------|-------|------|------|---------|------|------------------|------|------|------|---------|-------|-------|-------|---------|------|---------|------|------------------------------------|------|------|------|----|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | HT=7' | HT=8' | HT=9' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 8 | 8 | 6 | 8.5 | 5 | 8.5 | 69.3 | 34.0 | 34.0 | 34.0 | 5 | 12 | 133.5 | 98.5 | 5 | 12 | 39.0 | 43.0 | 5 | 7 | 6 | 7 | 60.9 | 90 | 102 | 114 | 6 | 6.5 | 58.0 | 63.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 10 | 8 | 8 | 6 | 8 | 5 | 8 | 69.3 | 35.0 | 35.0 | 35.0 | 6 | 16 | 137.5 | 105.5 | 6 | 16 | 45.0 | 49.0 | 5 | 7 | 6 | 6 | 54.8 | 90 | 102 | 114 | 7 | 7 | 60.0 | 64.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | |
| 4 FT | 12 | 11 | 8 | 8 | 6 | 7.5 | 5 | 6 | 52.4 | 32.0 | 32.0 | 32.0 | 6 | 14 | 80.0 | 103.0 | 6 | 14 | 39.0 | 42.0 | 5 | 6.5 | 6 | 7 | 49.1 | 91 | 103 | 115 | 6 | 6 | 56.0 | 62.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | |
| 6 FT | 12 | 12 | 8 | 8 | 6 | 8 | 6 | 7.5 | 48.9 | 32.0 | 32.0 | 32.0 | 6 | 13 | 66.0 | 81.0 | 6 | 13 | 37.0 | 39.0 | 5 | 6 | 5 | 6 | 42.1 | 92 | 104 | 116 | 7 | 7 | 57.0 | 65.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 13 | 8 | 8 | 6 | 7.5 | 6 | 7 | 45.5 | 32.0 | 32.0 | 32.0 | 6 | 12 | 61.0 | 69.0 | 6 | 12 | 35.0 | 37.0 | 6 | 8.5 | 5 | 6 | 39.1 | 93 | 105 | 117 | 7 | 7 | 56.0 | 66.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 14 | 9 | 8 | 6 | 7 | 5 | 6 | 41.3 | 33.0 | 33.0 | 33.0 | 7 | 15 | 61.0 | 69.0 | 7 | 15 | 38.0 | 40.0 | 6 | 8 | 5 | 7 | 38.4 | 94 | 106 | 118 | 7 | 6.5 | 55.0 | 65.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | |
| 12 FT | 15 | 16 | 9 | 8 | 6 | 7.5 | 5 | 6.5 | 43.5 | 35.0 | 35.0 | 35.0 | 6 | 12 | 62.0 | 71.0 | 6 | 12 | 40.0 | 43.0 | 6 | 7 | 5 | 8 | 36.8 | 96 | 108 | 120 | 6 | 6 | 52.0 | 63.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | |
| 14 FT | 16 | 17 | 9 | 8 | 6 | 7 | 5 | 6 | 41.9 | 36.0 | 36.0 | 36.0 | 6 | 12 | 61.0 | 70.0 | 6 | 12 | 40.0 | 43.0 | 6 | 7 | 5 | 7.5 | 35.8 | 97 | 109 | 121 | 7 | 7 | 54.0 | 66.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | |
| 16 FT | 17 | 18 | 9 | 8 | 6 | 7 | 5 | 6 | 40.8 | 37.0 | 37.0 | 37.0 | 7 | 15 | 65.0 | 75.0 | 7 | 15 | 44.0 | 48.0 | 6 | 6.5 | 5 | 7 | 34.9 | 98 | 110 | 122 | 7 | 7 | 54.0 | 66.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | | | |
| 18 FT | 18 | 20 | 9 | 8 | 6 | 6.5 | 6 | 8 | 44.0 | 38.0 | 38.0 | 38.0 | 7 | 15 | 64.0 | 75.0 | 7 | 15 | 44.0 | 47.0 | 6 | 6 | 5 | 7 | 34.0 | 100 | 112 | 124 | 7 | 7 | 54.0 | 66.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | |
| 20 FT | 20 | 21 | 9 | 8 | 6 | 6.5 | 5 | 6 | 38.9 | 40.0 | 40.0 | 40.0 | 7 | 15 | 63.0 | 75.0 | 7 | 15 | 44.0 | 48.0 | 7 | 8 | 5 | 6.5 | 33.9 | 101 | 113 | 125 | 7 | 7 | 54.0 | 66.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | |
| 22 FT | 21 | 22 | 9 | 8 | 6 | 6 | 6 | 8 | 42.4 | 41.0 | 41.0 | 41.0 | 7 | 14 | 63.0 | 74.0 | 7 | 14 | 44.0 | 47.0 | 7 | 7 | 5 | 6 | 33.5 | 102 | 114 | 126 | 7 | 6.5 | 54.0 | 66.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | |
| 24 FT | 23 | 24 | 9 | 8 | 7 | 7.5 | 6 | 7 | 42.0 | 47.0 | 47.0 | 47.0 | 7 | 15 | 62.0 | 74.0 | 7 | 15 | 44.0 | 47.0 | 7 | 7 | 6 | 7 | 36.4 | 104 | 116 | 128 | 7 | 7 | 54.0 | 66.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | |
| 26 FT | 24 | 25 | 9 | 8 | 7 | 7.5 | 6 | 7 | 41.6 | 48.0 | 48.0 | 48.0 | 7 | 14 | 62.0 | 74.0 | 7 | 14 | 43.0 | 47.0 | 7 | 6.5 | 6 | 7 | 36.1 | 105 | 117 | 129 | 7 | 6.5 | 54.0 | 66.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | | | | | | | | | | |
| 28 FT | 25 | 26 | 9 | 8 | 7 | 7 | 6 | 6 | 41.4 | 49.0 | 49.0 | 49.0 | 7 | 14 | 61.0 | 73.0 | 7 | 14 | 43.0 | 47.0 | 7 | 6 | 6 | 6.5 | 35.9 | 106 | 118 | 130 | 7 | 6 | 54.0 | 66.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 30 FT | 27 | 28 | 10 | 8 | 7 | 6.5 | 6 | 7 | 42.3 | 51.0 | 51.0 | 51.0 | 7 | 13 | 61.0 | 73.0 | 7 | 13 | 42.0 | 45.0 | 7 | 6 | 6 | 7 | 36.5 | 108 | 120 | 132 | 7 | 6 | 54.0 | 67.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | |
| 32 FT | 28 | 29 | 10 | 8 | 7 | 6.5 | 6 | 6.5 | 42.0 | 52.0 | 52.0 | 52.0 | 7 | 12 | 61.0 | 73.0 | 7 | 12 | 41.0 | 44.0 | 7 | 6 | 6 | 6.5 | 36.4 | 109 | 121 | 133 | 8 | 7.5 | 60.0 | 73.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 34 FT | 29 | 30 | 10 | 8 | 7 | 6 | 6 | 6 | 41.9 | 53.0 | 53.0 | 53.0 | 7 | 12 | 61.0 | 72.0 | 7 | 12 | 41.0 | 44.0 | 8 | 7 | 6 | 6 | 6.5 | 36.4 | 110 | 122 | 134 | 8 | 7 | 60.0 | 73.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | |
| 36 FT | 30 | 32 | 11 | 8 | 7 | 6 | 6 | 7 | 42.9 | 54.0 | 54.0 | 54.0 | 7 | 12 | 61.0 | 72.0 | 7 | 12 | 41.0 | 43.0 | 7 | 6 | 6 | 6.5 | 36.9 | 112 | 124 | 136 | 8 | 7 | 60.0 | 73.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 38 FT | 31 | 33 | 11 | 8 | 8 | 7.5 | 6 | 6.5 | 42.9 | 55.0 | 55.0 | 55.0 | 8 | 15 | 68.0 | 79.0 | 8 | 15 | 48.0 | 51.0 | 8 | 7.5 | 6 | 6.5 | 37.0 | 113 | 125 | 137 | 8 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | |
| 40 FT | 32 | 34 | 11 | 8 | 8 | 7.5 | 6 | 6.5 | 42.9 | 56.0 | 56.0 | 56.0 | 8 | 14 | 68.0 | 79.0 | 8 | 14 | 48.0 | 50.0 | 8 | 7.5 | 6 | 6 | 37.1 | 114 | 126 | 138 | 8 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 42 FT | 33 | 35 | 12 | 8 | 8 | 7 | 6 | 7 | 43.8 | 57.0 | 57.0 | 57.0 | 8 | 14 | 68.0 | 78.0 | 8 | 14 | 47.0 | 49.0 | 8 | 7 | 6 | 6.5 | 37.6 | 115 | 127 | 139 | 8 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | |
| 44 FT | 34 | 36 | 12 | 8 | 8 | 7 | 6 | 6.5 | 43.8 | 58.0 | 58.0 | 58.0 | 8 | 14 | 68.0 | 78.0 | 8 | 14 | 47.0 | 48.0 | 8 | 7 | 6 | 6.5 | 37.8 | 116 | 128 | 140 | 8 | 6 | 60.0 | 73.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 46 FT | 35 | 37 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 42.9 | 59.0 | 59.0 | 59.0 | 8 | 13 | 67.0 | 77.0 | 8 | 13 | 46.0 | 47.0 | 8 | 7 | 6 | 6.5 | 37.0 | 117 | 129 | 141 | 8 | 6 | 60.0 | 73.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 48 FT | 36 | 38 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 43.0 | 60.0 | 60.0 | 60.0 | 8 | 13 | 67.0 | 76.0 | 8 | 13 | 46.0 | 47.0 | 8 | 7 | 6 | 6 | 37.1 | 118 | 130 | 142 | 8 | 6 | 60.0 | 73.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | |
| 50 FT | 37 | 39 | 12 | 8 | 8 | 6.5 | 6 | 6 | 43.1 | 61.0 | 61.0 | 61.0 | 8 | 13 | 67.0 | 75.0 | 8 | 13 | 46.0 | 47.0 | 8 | 7 | 6 | 6 | 37.4 | 119 | 131 | 143 | 8 | 6 | 60.0 | 73.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | |

| SPAN (S) = 14 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 10 FT OR 11 FT OR 12 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|-------|-------|---------|------|------|------|------------------|------|---------|------|------|--------|--------|--------|---------|------|------|------|---------|------|---------------------------------------|------|-----------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | | | HT=10' | HT=11' | HT=12' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 14 | 10 | 9 | 10 | 6 | 8.5 | 5 | 7 | 70.3 | 34.0 | 34.0 | 34.0 | 5 | 12 | 134.5 | 99.5 | 5 | 12 | 39.0 | 43.0 | 5 | 7 | 6 | 6 | 80.1 | 126 | 138 | 150 | 6 | 6 | 60.0 | 63.0 | 5 | 10.5 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 11 | 9 | 10 | 6 | 8 | 5 | 7 | 70.3 | 35.0 | 35.0 | 35.0 | 6 | 16 | 138.5 | 106.5 | 6 | 16 | 45.0 | 48.0 | 5 | 6.5 | 6 | 6 | 73.6 | 127 | 139 | 151 | 6 | 6.5 | 59.0 | 62.0 | 5 | 12 | 5 | 9 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 11 | 11 | 11 | 10 | 6 | 7 | 5 | 6 | 66.6 | 31.0 | 31.0 | 31.0 | 6 | 13 | 81.0 | 94.0 | 6 | 13 | 39.0 | 40.0 | 5 | 6.5 | 5 | 6 | 61.8 | 127 | 139 | 151 | 7 | 7 | 61.0 | 65.0 | 5 | 9.5 | 5 | 10 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 12 | 12 | 11 | 10 | 6 | 8 | 5 | 6.5 | 60.6 | 32.0 | 32.0 | 32.0 | 6 | 13 | 67.0 | 75.0 | 6 | 13 | 37.0 | 39.0 | 5 | 6 | 5 | 6 | 57.3 | 128 | 140 | 152 | 7 | 7 | 59.0 | 65.0 | 5 | 12 | 5 | 10.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 12 | 13 | 11 | 10 | 6 | 8 | 5 | 6 | 56.3 | 32.0 | 32.0 | 32.0 | 6 | 12 | 62.0 | 67.0 | 6 | 12 | 36.0 | 37.0 | 5 | 6 | 6 | 7 | 57.4 | 129 | 141 | 153 | 7 | 6.5 | 57.0 | 65.0 | 5 | 12 | 5 | 10 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 13 | 14 | 11 | 10 | 6 | 7.5 | 6 | 8 | 56.3 | 33.0 | 33.0 | 37.0 | 6 | 12 | 59.0 | 65.0 | 6 | 12 | 35.0 | 37.0 | 6 | 7.5 | 6 | 7 | 55.0 | 130 | 142 | 154 | 7 | 6.5 | 57.0 | 65.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 14 | 16 | 12 | 10 | 6 | 7.5 | 6 | 8 | 54.9 | 34.0 | 34.0 | 34.0 | 7 | 15 | 61.0 | 67.0 | 7 | 15 | 38.0 | 39.0 | 6 | 7 | 5 | 6 | 50.9 | 132 | 144 | 156 | 7 | 7 | 56.0 | 66.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 16 | 17 | 12 | 10 | 6 | 7.5 | 6 | 8 | 59.3 | 36.0 | 36.0 | 36.0 | 6 | 12 | 62.0 | 70.0 | 6 | 12 | 41.0 | 43.0 | 6 | 7 | 5 | 6 | 49.9 | 133 | 145 | 157 | 7 | 7 | 56.0 | 66.0 | 5 | 12 | 5 | 9 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 17 | 18 | 12 | 10 | 6 | 7 | 6 | 7.5 | 58.1 | 37.0 | 37.0 | 41.0 | 7 | 16 | 66.0 | 74.0 | 7 | 16 | 45.0 | 48.0 | 6 | 6.5 | 6 | 8 | 52.0 | 134 | 146 | 158 | 7 | 7 | 56.0 | 66.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 18 | 20 | 12 | 10 | 6 | 7 | 6 | 7 | 57.5 | 38.0 | 38.0 | 42.0 | 7 | 15 | 65.0 | 74.0 | 7 | 15 | 45.0 | 48.0 | 6 | 6 | 6 | 8 | 51.3 | 136 | 148 | 160 | 7 | 7 | 55.0 | 66.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 19 | 21 | 12 | 10 | 6 | 6 | 6 | 6.5 | 56.6 | 39.0 | 39.0 | 43.0 | 7 | 14 | 64.0 | 74.0 | 7 | 14 | 45.0 | 48.0 | 7 | 8 | 6 | 6 | 7.5 | 50.6 | 137 | 149 | 161 | 7 | 7 | 55.0 | 66.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 21 | 22 | 12 | 10 | 6 | 6 | 6 | 6.5 | 55.9 | 41.0 | 41.0 | 45.0 | 7 | 15 | 64.0 | 74.0 | 7 | 15 | 45.0 | 48.0 | 7 | 7 | 6 | 6 | 6.5 | 50.3 | 138 | 150 | 162 | 7 | 7 | 55.0 | 66.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 22 | 24 | 13 | 10 | 6 | 6 | 6 | 6.5 | 56.4 | 42.0 | 42.0 | 46.0 | 7 | 14 | 63.0 | 73.0 | 7 | 14 | 44.0 | 48.0 | 7 | 7 | 6 | 7.5 | 50.4 | 140 | 152 | 164 | 7 | 7 | 55.0 | 67.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 23 | 25 | 14 | 10 | 7 | 7 | 6 | 6.5 | 56.6 | 43.0 | 43.0 | 47.0 | 7 | 14 | 63.0 | 73.0 | 7 | 14 | 44.0 | 48.0 | 7 | 6.5 | 6 | 8 | 50.4 | 141 | 153 | 165 | 7 | 6.5 | 55.0 | 67.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 25 | 27 | 14 | 10 | 7 | 7 | 6 | 6.5 | 56.4 | 45.0 | 45.0 | 49.0 | 7 | 14 | 62.0 | 73.0 | 7 | 14 | 43.0 | 47.0 | 7 | 6.5 | 6 | 8 | 50.3 | 143 | 155 | 167 | 7 | 6 | 55.0 | 67.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 26 | 28 | 14 | 10 | 7 | 7 | 6 | 6.5 | 56.0 | 46.0 | 46.0 | 50.0 | 7 | 13 | 62.0 | 73.0 | 7 | 13 | 43.0 | 47.0 | 7 | 6 | 6 | 7.5 | 50.0 | 144 | 156 | 168 | 7 | 6 | 55.0 | 67.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 27 | 29 | 14 | 10 | 7 | 6 | 6 | 6 | 55.6 | 51.0 | 51.0 | 51.0 | 7 | 12 | 62.0 | 72.0 | 7 | 12 | 43.0 | 46.0 | 7 | 6 | 6 | 7.5 | 49.8 | 145 | 157 | 169 | 8 | 7.5 | 61.0 | 73.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 29 | 31 | 15 | 10 | 7 | 6 | 6 | 6.5 | 56.3 | 53.0 | 53.0 | 53.0 | 7 | 12 | 61.0 | 72.0 | 7 | 12 | 41.0 | 44.0 | 7 | 6 | 6 | 7.5 | 50.3 | 147 | 159 | 171 | 8 | 7 | 61.0 | 73.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 30 | 32 | 15 | 10 | 7 | 6 | 6 | 6 | 56.1 | 54.0 | 54.0 | 54.0 | 7 | 12 | 61.0 | 71.0 | 7 | 12 | 41.0 | 43.0 | 8 | 7.5 | 6 | 7.5 | 50.3 | 148 | 160 | 172 | 8 | 7 | 61.0 | 73.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 31 | 33 | 16 | 10 | 8 | 7.5 | 6 | 6 | 56.9 | 55.0 | 55.0 | 55.0 | 8 | 15 | 69.0 | 79.0 | 8 | 15 | 49.0 | 51.0 | 8 | 7.5 | 6 | 7 | 50.6 | 149 | 161 | 173 | 8 | 6.5 | 61.0 | 73.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 32 | 34 | 16 | 10 | 8 | 7.5 | 6 | 6 | 56.9 | 56.0 | 56.0 | 56.0 | 8 | 14 | 69.0 | 78.0 | 8 | 14 | 48.0 | 50.0 | 8 | 7 | 6 | 7 | 50.6 | 150 | 162 | 174 | 8 | 6.5 | 61.0 | 73.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 33 | 35 | 16 | 10 | 8 | 7 | 6 | 6 | 56.9 | 57.0 | 57.0 | 57.0 | 8 | 14 | 69.0 | 78.0 | 8 | 14 | 48.0 | 49.0 | 8 | 7 | 6 | 6 | 6.5 | 50.8 | 151 | 163 | 175 | 8 | 6.5 | 61.0 | 73.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 34 | 36 | 17 | 10 | 8 | 7 | 6 | 6 | 57.6 | 58.0 | 58.0 | 58.0 | 8 | 14 | 68.0 | 77.0 | 8 | 14 | 47.0 | 49.0 | 8 | 7 | 6 | 6 | 6.5 | 51.3 | 152 | 164 | 176 | 8 | 6 | 61.0 | 73.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 35 | 37 | 17 | 10 | 8 | 6.5 | 6 | 6 | 56.5 | 59.0 | 59.0 | 59.0 | 8 | 13 | 68.0 | 77.0 | 8 | 13 | 47.0 | 48.0 | 8 | 7 | 6 | 6 | 6.5 | 50.1 | 153 | 165 | 177 | 8 | 6 | 61.0 | 73.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 35 | 38 | 17 | 10 | 8 | 6.5 | 6 | 6 | 56.5 | 59.0 | 59.0 | 59.0 | 8 | 13 | 68.0 | 77.0 | 8 | 13 | 47.0 | 49.0 | 8 | 7 | 6 | 6 | 6 | 50.1 | 154 | 166 | 178 | 8 | 6 | 61.0 | 73.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 36 | 39 | 17 | 10 | 8 | 6.5 | 7 | 7.5 | 61.6 | 60.0 | 60.0 | 60.0 | 8 | 13 | 68.0 | 76.0 | 8 | 13 | 47.0 | 48.0 | 8 | 6.5 | 6 | 6 | 50.3 | 155 | 167 | 179 | 8 | 6 | 61.0 | 73.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|--------|---------|------|-------|-------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|--------|---------|-------------------------------------|-----------|------|---------|------|---------|------|----|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | WALL BARS | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 10 | 8 | 8 | 6 | 8 | 5 | 8 | 72.9 | 35.0 | 35.0 | 35.0 | 6 | 16 | 146.5 | 111.5 | 6 | 16 | 48.0 | 53.0 | 5 | 7 | 7 | 6.5 | 69.0 | 102 | 114 | 126 | 6 | 6 | 61.0 | 65.0 | 5 | 12 | 5 | 12 | 2 | | | | | | | |
| 2 FT | 15 | 11 | 9 | 8 | 6 | 7.5 | 5 | 8 | 73.5 | 35.0 | 35.0 | 35.0 | 6 | 16 | 146.5 | 111.5 | 6 | 16 | 49.0 | 53.0 | 5 | 6.5 | 6 | 7 | 60.4 | 103 | 115 | 127 | 6 | 6 | 59.0 | 65.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 4 FT | 12 | 11 | 9 | 8 | 6 | 6.5 | 6 | 7 | 60.8 | 32.0 | 36.0 | 36.0 | 6 | 12 | 84.0 | 109.0 | 6 | 12 | 40.0 | 43.0 | 5 | 6.5 | 6 | 6.5 | 53.9 | 103 | 115 | 127 | 7 | 6.5 | 61.0 | 68.0 | 5 | 11.5 | 5 | 12 | 12 | | | | | | | |
| 6 FT | 12 | 12 | 9 | 8 | 6 | 7 | 6 | 6.5 | 53.5 | 32.0 | 32.0 | 36.0 | 7 | 16 | 72.0 | 86.0 | 7 | 16 | 41.0 | 43.0 | 6 | 8 | 6 | 7 | 49.9 | 104 | 116 | 128 | 7 | 6.5 | 60.0 | 68.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | |
| 8 FT | 13 | 14 | 9 | 8 | 6 | 7 | 6 | 7 | 49.5 | 33.0 | 33.0 | 33.0 | 7 | 15 | 67.0 | 77.0 | 7 | 15 | 39.0 | 42.0 | 6 | 8 | 5 | 6.5 | 43.4 | 106 | 118 | 130 | 7 | 7 | 58.0 | 69.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 10 FT | 14 | 15 | 9 | 8 | 6 | 7 | 6 | 7.5 | 46.6 | 34.0 | 34.0 | 34.0 | 7 | 15 | 64.0 | 73.0 | 7 | 15 | 39.0 | 41.0 | 6 | 7.5 | 5 | 6.5 | 41.5 | 107 | 119 | 131 | 7 | 6.5 | 58.0 | 69.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | |
| 12 FT | 15 | 16 | 9 | 8 | 6 | 6 | 6 | 7.5 | 50.4 | 35.0 | 35.0 | 35.0 | 7 | 14 | 70.0 | 80.0 | 7 | 14 | 46.0 | 49.0 | 6 | 6 | 5 | 6 | 40.0 | 108 | 120 | 132 | 7 | 6.5 | 57.0 | 69.0 | 5 | 12 | 5 | 11.5 | 0 | | | | | | | |
| 14 FT | 17 | 18 | 9 | 8 | 6 | 6.5 | 6 | 7.5 | 48.4 | 37.0 | 37.0 | 37.0 | 7 | 15 | 68.0 | 79.0 | 7 | 15 | 46.0 | 49.0 | 6 | 6.5 | 5 | 6 | 38.9 | 110 | 122 | 134 | 7 | 6.5 | 57.0 | 69.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | |
| 16 FT | 18 | 19 | 9 | 8 | 6 | 6.5 | 6 | 7.5 | 47.1 | 38.0 | 38.0 | 42.0 | 7 | 14 | 67.0 | 79.0 | 7 | 14 | 45.0 | 49.0 | 6 | 6 | 6 | 8.5 | 41.0 | 111 | 123 | 135 | 7 | 6.5 | 57.0 | 69.0 | 5 | 12 | 5 | 8.5 | 0 | | | | | | | |
| 18 FT | 19 | 21 | 10 | 8 | 6 | 6 | 6 | 7.5 | 47.8 | 39.0 | 39.0 | 39.0 | 7 | 14 | 66.0 | 78.0 | 7 | 14 | 45.0 | 49.0 | 7 | 8 | 5 | 6.5 | 37.9 | 113 | 125 | 137 | 7 | 6.5 | 57.0 | 70.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | |
| 20 FT | 21 | 22 | 10 | 8 | 6 | 6 | 6 | 7.5 | 46.6 | 41.0 | 41.0 | 41.0 | 7 | 14 | 66.0 | 78.0 | 7 | 14 | 45.0 | 49.0 | 7 | 7.5 | 5 | 6 | 37.5 | 114 | 126 | 138 | 7 | 6.5 | 56.0 | 70.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | |
| 22 FT | 23 | 24 | 10 | 8 | 7 | 7.5 | 6 | 7.5 | 46.0 | 43.0 | 43.0 | 43.0 | 7 | 14 | 65.0 | 77.0 | 7 | 14 | 45.0 | 49.0 | 7 | 7 | 5 | 6 | 37.3 | 116 | 128 | 140 | 7 | 6.5 | 56.0 | 70.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | |
| 24 FT | 24 | 25 | 11 | 8 | 7 | 7.5 | 6 | 8 | 46.5 | 44.0 | 44.0 | 44.0 | 7 | 13 | 64.0 | 77.0 | 7 | 13 | 45.0 | 49.0 | 7 | 6.5 | 5 | 6.5 | 37.5 | 117 | 129 | 141 | 7 | 6.5 | 56.0 | 70.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | |
| 26 FT | 25 | 27 | 11 | 8 | 7 | 7 | 6 | 7.5 | 46.4 | 45.0 | 45.0 | 45.0 | 7 | 13 | 64.0 | 77.0 | 7 | 13 | 44.0 | 48.0 | 7 | 6.5 | 5 | 6 | 37.1 | 119 | 131 | 143 | 7 | 6 | 56.0 | 70.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | |
| 28 FT | 27 | 28 | 11 | 8 | 7 | 6.5 | 6 | 7.5 | 45.8 | 47.0 | 47.0 | 47.0 | 7 | 13 | 64.0 | 76.0 | 7 | 13 | 44.0 | 48.0 | 7 | 6 | 5 | 6 | 37.1 | 120 | 132 | 144 | 7 | 6 | 56.0 | 70.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | |
| 30 FT | 28 | 30 | 12 | 8 | 7 | 6.5 | 6 | 7.5 | 46.8 | 52.0 | 52.0 | 52.0 | 7 | 12 | 63.0 | 76.0 | 7 | 12 | 43.0 | 47.0 | 8 | 7.5 | 6 | 8 | 40.4 | 122 | 134 | 146 | 8 | 7.5 | 62.0 | 76.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | |
| 32 FT | 30 | 31 | 12 | 8 | 7 | 6 | 6 | 7.5 | 46.3 | 54.0 | 54.0 | 54.0 | 7 | 12 | 63.0 | 75.0 | 7 | 12 | 42.0 | 45.0 | 8 | 7.5 | 6 | 7.5 | 40.5 | 123 | 135 | 147 | 8 | 7 | 62.0 | 76.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | |
| 34 FT | 31 | 32 | 12 | 8 | 8 | 7.5 | 6 | 7.5 | 46.1 | 55.0 | 55.0 | 55.0 | 8 | 15 | 71.0 | 83.0 | 8 | 15 | 50.0 | 53.0 | 8 | 6.5 | 6 | 7.5 | 40.3 | 124 | 136 | 148 | 8 | 6.5 | 62.0 | 76.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | |
| 36 FT | 32 | 34 | 12 | 8 | 8 | 7.5 | 6 | 7 | 46.1 | 56.0 | 56.0 | 56.0 | 8 | 14 | 71.0 | 82.0 | 8 | 14 | 49.0 | 52.0 | 8 | 7 | 6 | 7 | 40.3 | 126 | 138 | 150 | 8 | 6.5 | 62.0 | 76.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | |
| 38 FT | 33 | 35 | 13 | 8 | 8 | 7 | 6 | 7 | 47.0 | 57.0 | 57.0 | 57.0 | 8 | 14 | 71.0 | 82.0 | 8 | 14 | 49.0 | 51.0 | 8 | 7 | 6 | 6.5 | 40.8 | 127 | 139 | 151 | 8 | 6.5 | 62.0 | 76.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | |
| 40 FT | 34 | 36 | 13 | 8 | 8 | 7 | 6 | 6.5 | 46.9 | 58.0 | 58.0 | 58.0 | 8 | 14 | 70.0 | 81.0 | 8 | 14 | 49.0 | 51.0 | 8 | 6.5 | 6 | 6.5 | 40.8 | 128 | 140 | 152 | 8 | 6 | 62.0 | 76.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | |
| 42 FT | 35 | 37 | 13 | 8 | 8 | 6.5 | 6 | 6.5 | 46.9 | 59.0 | 59.0 | 59.0 | 8 | 13 | 70.0 | 81.0 | 8 | 13 | 48.0 | 50.0 | 8 | 6 | 6 | 6.5 | 40.9 | 129 | 141 | 153 | 8 | 6 | 62.0 | 76.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | |
| 44 FT | 36 | 38 | 13 | 8 | 8 | 6.5 | 6 | 6.5 | 46.9 | 60.0 | 60.0 | 60.0 | 8 | 13 | 70.0 | 80.0 | 8 | 13 | 48.0 | 49.0 | 8 | 6 | 6 | 6 | 41.0 | 130 | 142 | 154 | 8 | 6 | 62.0 | 76.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | |
| 46 FT | 37 | 39 | 13 | 8 | 8 | 6.5 | 6 | 6 | 46.9 | 61.0 | 61.0 | 61.0 | 8 | 12 | 70.0 | 79.0 | 8 | 12 | 47.0 | 49.0 | 8 | 6 | 6 | 6 | 41.1 | 131 | 143 | 155 | 8 | 6 | 62.0 | 76.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | |
| 48 FT | 38 | 41 | 13 | 8 | 8 | 6 | 6 | 6 | 46.1 | 62.0 | 62.0 | 62.0 | 8 | 12 | 69.0 | 78.0 | 8 | 12 | 46.0 | 48.0 | 8 | 6.5 | 7 | 7 | 43.3 | 133 | 145 | 157 | 9 | 7.5 | 68.0 | 82.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | |
| 50 FT | 39 | 42 | 14 | 8 | 8 | 6 | 6 | 6 | 47.1 | 63.0 | 63.0 | 63.0 | 8 | 12 | 69.0 | 77.0 | 8 | 12 | 46.0 | 47.0 | 8 | 6.5 | 7 | 7.5 | 43.9 | 134 | 146 | 158 | 9 | 7 | 68.0 | 82.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|-------|-------|---------|------|------|------|------------------|------|---------|------|------|--------|---------|--------|------|------|---------|------|---------------------------------------|------|------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 11 | 9 | 10 | 6 | 8 | 5 | 6.5 | 73.9 | 35.0 | 35.0 | 35.0 | 6 | 16 | 147.5 | 112.5 | 6 | 16 | 48.0 | 52.0 | 5 | 6.5 | 6 | 6 | 89.3 | 139 | 151 | 163 | 6 | 6.5 | 63.0 | 67.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 11 | 10 | 10 | 6 | 7.5 | 5 | 6.5 | 74.5 | 35.0 | 35.0 | 35.0 | 6 | 16 | 147.5 | 112.5 | 6 | 16 | 49.0 | 53.0 | 5 | 6.5 | 6 | 6 | 77.1 | 139 | 151 | 163 | 6 | 6 | 61.0 | 65.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 FT | 12 | 12 | 10 | 10 | 6 | 7 | 6 | 7.5 | 77.5 | 32.0 | 36.0 | 36.0 | 6 | 13 | 89.0 | 107.0 | 6 | 13 | 41.0 | 43.0 | 5 | 6 | 6 | 6.5 | 71.3 | 140 | 152 | 164 | 6 | 6 | 60.0 | 67.0 | 5 | 10 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 FT | 12 | 12 | 10 | 10 | 6 | 7 | 6 | 7 | 67.9 | 32.0 | 36.0 | 36.0 | 7 | 16 | 74.0 | 83.0 | 7 | 16 | 41.0 | 43.0 | 6 | 8 | 6 | 6 | 65.1 | 140 | 152 | 164 | 7 | 6 | 61.0 | 68.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 FT | 13 | 14 | 10 | 10 | 6 | 7.5 | 6 | 6.5 | 63.0 | 33.0 | 37.0 | 37.0 | 7 | 16 | 69.0 | 75.0 | 7 | 16 | 40.0 | 42.0 | 6 | 7.5 | 6 | 6 | 62.3 | 142 | 154 | 166 | 7 | 6.5 | 60.0 | 69.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 FT | 14 | 15 | 10 | 10 | 6 | 7 | 6 | 6.5 | 59.4 | 34.0 | 38.0 | 38.0 | 7 | 15 | 66.0 | 73.0 | 7 | 15 | 40.0 | 42.0 | 6 | 7 | 7 | 6.5 | 62.4 | 143 | 155 | 167 | 7 | 6.5 | 59.0 | 69.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 FT | 15 | 17 | 11 | 10 | 6 | 7 | 6 | 6.5 | 63.5 | 35.0 | 35.0 | 39.0 | 7 | 14 | 71.0 | 79.0 | 7 | 14 | 47.0 | 49.0 | 6 | 7 | 6 | 7 | 57.5 | 145 | 157 | 169 | 7 | 7 | 59.0 | 69.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 FT | 17 | 18 | 12 | 10 | 6 | 7 | 6 | 6.5 | 62.4 | 37.0 | 41.0 | 41.0 | 7 | 15 | 70.0 | 78.0 | 7 | 15 | 47.0 | 49.0 | 6 | 6.5 | 6 | 7 | 56.4 | 146 | 158 | 170 | 7 | 6.5 | 58.0 | 69.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 FT | 18 | 19 | 12 | 10 | 6 | 6.5 | 6 | 6.5 | 61.1 | 38.0 | 42.0 | 42.0 | 7 | 14 | 68.0 | 78.0 | 7 | 14 | 46.0 | 49.0 | 6 | 6 | 6 | 7 | 55.4 | 147 | 159 | 171 | 7 | 6.5 | 58.0 | 69.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 FT | 19 | 21 | 12 | 10 | 6 | 6 | 6 | 6 | 60.4 | 39.0 | 43.0 | 43.0 | 7 | 14 | 68.0 | 77.0 | 7 | 14 | 46.0 | 49.0 | 7 | 8 | 6 | 6 | 54.6 | 149 | 161 | 173 | 7 | 6.5 | 58.0 | 70.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 FT | 21 | 22 | 13 | 10 | 6 | 6 | 6 | 6 | 60.3 | 41.0 | 45.0 | 45.0 | 7 | 14 | 67.0 | 77.0 | 7 | 14 | 46.0 | 49.0 | 7 | 7 | 6 | 6.5 | 54.5 | 150 | 162 | 174 | 7 | 6.5 | 58.0 | 70.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 FT | 22 | 24 | 13 | 10 | 6 | 6 | 6 | 6 | 59.6 | 42.0 | 46.0 | 46.0 | 7 | 14 | 66.0 | 77.0 | 7 | 14 | 46.0 | 49.0 | 7 | 7 | 6 | 6.5 | 54.0 | 152 | 164 | 176 | 7 | 6.5 | 58.0 | 70.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 FT | 24 | 25 | 14 | 10 | 7 | 7.5 | 6 | 6 | 59.8 | 44.0 | 48.0 | 48.0 | 7 | 14 | 66.0 | 77.0 | 7 | 14 | 45.0 | 49.0 | 7 | 6.5 | 6 | 7 | 54.1 | 153 | 165 | 177 | 7 | 6.5 | 58.0 | 70.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 FT | 25 | 27 | 14 | 10 | 7 | 7 | 6 | 6 | 59.5 | 45.0 | 49.0 | 49.0 | 7 | 13 | 65.0 | 76.0 | 7 | 13 | 45.0 | 49.0 | 7 | 6.5 | 6 | 7 | 53.8 | 155 | 167 | 179 | 7 | 6 | 58.0 | 70.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 FT | 26 | 28 | 15 | 10 | 7 | 6.5 | 6 | 6 | 59.9 | 50.0 | 50.0 | 50.0 | 7 | 13 | 65.0 | 76.0 | 7 | 13 | 45.0 | 49.0 | 7 | 6 | 6 | 7 | 53.9 | 156 | 168 | 180 | 7 | 6 | 58.0 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 FT | 28 | 30 | 15 | 10 | 7 | 6.5 | 7 | 8 | 64.5 | 52.0 | 52.0 | 52.0 | 7 | 12 | 64.0 | 76.0 | 7 | 12 | 44.0 | 47.0 | 8 | 7.5 | 6 | 7 | 53.8 | 158 | 170 | 182 | 8 | 7.5 | 64.0 | 76.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 FT | 29 | 31 | 15 | 10 | 7 | 6 | 7 | 7 | 64.3 | 53.0 | 53.0 | 53.0 | 7 | 12 | 64.0 | 75.0 | 7 | 12 | 44.0 | 47.0 | 8 | 7.5 | 6 | 6.5 | 53.5 | 159 | 171 | 183 | 8 | 7 | 64.0 | 76.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 FT | 31 | 32 | 16 | 10 | 8 | 7.5 | 6 | 6 | 59.6 | 55.0 | 55.0 | 55.0 | 8 | 15 | 72.0 | 83.0 | 8 | 15 | 50.0 | 53.0 | 8 | 6.5 | 6 | 7 | 53.8 | 160 | 172 | 184 | 8 | 6.5 | 64.0 | 76.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 FT | 32 | 34 | 16 | 10 | 8 | 7.5 | 7 | 7 | 64.5 | 56.0 | 56.0 | 56.0 | 8 | 14 | 72.0 | 82.0 | 8 | 14 | 50.0 | 52.0 | 8 | 7 | 6 | 7 | 53.8 | 162 | 174 | 186 | 8 | 6.5 | 63.0 | 77.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 FT | 33 | 35 | 17 | 10 | 8 | 7 | 7 | 7.5 | 65.1 | 57.0 | 57.0 | 57.0 | 8 | 14 | 71.0 | 82.0 | 8 | 14 | 49.0 | 52.0 | 8 | 7 | 6 | 6.5 | 54.0 | 163 | 175 | 187 | 8 | 6.5 | 63.0 | 77.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 FT | 34 | 36 | 17 | 10 | 8 | 7 | 7 | 7 | 65.1 | 58.0 | 58.0 | 58.0 | 8 | 14 | 71.0 | 81.0 | 8 | 14 | 49.0 | 51.0 | 8 | 6.5 | 6 | 6.5 | 54.0 | 164 | 176 | 188 | 8 | 6 | 63.0 | 77.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 FT | 35 | 37 | 18 | 10 | 8 | 6.5 | 7 | 7.5 | 65.9 | 59.0 | 59.0 | 59.0 | 8 | 13 | 71.0 | 80.0 | 8 | 13 | 49.0 | 50.0 | 8 | 6 | 6 | 6.5 | 54.4 | 165 | 177 | 189 | 8 | 6 | 64.0 | 77.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 FT | 36 | 39 | 18 | 10 | 8 | 6.5 | 7 | 7 | 66.0 | 60.0 | 60.0 | 60.0 | 8 | 13 | 71.0 | 80.0 | 8 | 13 | 48.0 | 50.0 | 8 | 6.5 | 6 | 6 | 54.6 | 167 | 179 | 191 | 8 | 6 | 63.0 | 77.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 FT | 37 | 40 | 19 | 10 | 8 | 6.5 | 7 | 7.5 | 66.8 | 61.0 | 61.0 | 61.0 | 8 | 12 | 70.0 | 79.0 | 8 | 12 | 48.0 | 49.0 | 8 | 6.5 | 6 | 6 | 55.0 | 168 | 180 | 192 | 9 | 7.5 | 70.0 | 83.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 FT | 38 | 41 | 19 | 10 | 8 | 6 | 7 | 6.5 | 66.8 | 62.0 | 62.0 | 68.0 | 8 | 12 | 70.0 | 78.0 | 8 | 12 | 47.0 | 48.0 | 8 | 6.5 | 7 | 8 | 58.1 | 169 | 181 | 193 | 9 | 7 | 70.0 | 83.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 FT | 39 | 42 | 19 | 10 | 8 | 6 | 7 | 7 | 65.6 | 63.0 | 63.0 | 69.0 | 8 | 12 | 70.0 | 77.0 | 8 | 12 | 47.0 | 48.0 | 8 | 6.5 | 7 | 7.5 | 57.0 | 170 | 182 | 194 | 9 | 7 | 69.0 | 83.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SPAN (S) = 15 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 14 FT OR 15 FT OR 16 FT | | | | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|-------|--------|---------|--------|------|------|---------|-------|------------------|------|---------|------|---------|------|------|------|---------|--------|--------|--------|-----------|------|---------|------|---------------------------------------|------|------|------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=14' | HT=15' | HT=16' | | | | | | | | | | | | | | HT=14' | HT=15' | HT=16' | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 11 | 12 | 13 | 6 | 8 | 6 | 8 | 79.3 | 35.0 | 35.0 | 39.0 | 6 | 16 | 152.5 | 114.5 | 6 | 16 | 48.0 | 51.0 | 5 | 6.5 | 6 | 6 | 99.0 | 175 | 187 | 199 | 6 | 6 | 64.0 | 65.0 | 5 | 11.5 | 5 | 7 | 12 | | | | | | | | | | | | | | | | |
| 2 FT | 15 | 12 | 12 | 13 | 6 | 8 | 6 | 8 | 79.3 | 35.0 | 35.0 | 39.0 | 6 | 16 | 152.5 | 114.5 | 6 | 16 | 49.0 | 52.0 | 5 | 6 | 6 | 6.5 | 95.5 | 176 | 188 | 200 | 6 | 6 | 63.0 | 66.0 | 5 | 11.5 | 5 | 7 | 12 | | | | | | | | | | | | | | | | |
| 4 FT | 12 | 12 | 12 | 13 | 6 | 7 | 6 | 7 | 111.5 | 36.0 | 36.0 | 36.0 | 6 | 13 | 99.0 | 91.0 | 6 | 13 | 41.0 | 42.0 | 5 | 6 | 6 | 6 | 88.6 | 176 | 188 | 200 | 7 | 6.5 | 65.0 | 69.0 | 5 | 9.5 | 5 | 7 | 12 | | | | | | | | | | | | | | | | |
| 6 FT | 12 | 13 | 12 | 13 | 6 | 7.5 | 6 | 6.5 | 85.6 | 36.0 | 36.0 | 36.0 | 6 | 12 | 71.0 | 73.0 | 6 | 12 | 40.0 | 40.0 | 6 | 8 | 6 | 6 | 84.0 | 177 | 189 | 201 | 7 | 6.5 | 64.0 | 69.0 | 5 | 12 | 5 | 6.5 | 12 | | | | | | | | | | | | | | | | |
| 8 FT | 13 | 14 | 13 | 13 | 6 | 7.5 | 6 | 7 | 77.4 | 37.0 | 37.0 | 37.0 | 6 | 12 | 67.0 | 70.0 | 6 | 12 | 38.0 | 39.0 | 6 | 7.5 | 6 | 6 | 78.1 | 178 | 190 | 202 | 7 | 6.5 | 62.0 | 68.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 10 FT | 14 | 16 | 13 | 13 | 6 | 7.5 | 6 | 6 | 75.0 | 38.0 | 38.0 | 38.0 | 7 | 15 | 67.0 | 71.0 | 7 | 15 | 41.0 | 42.0 | 6 | 7 | 6 | 6 | 77.0 | 180 | 192 | 204 | 7 | 7 | 61.0 | 69.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 12 FT | 15 | 17 | 14 | 13 | 6 | 7 | 6 | 6 | 78.9 | 39.0 | 39.0 | 39.0 | 7 | 15 | 73.0 | 78.0 | 7 | 15 | 48.0 | 50.0 | 6 | 7 | 6 | 6.5 | 74.8 | 181 | 193 | 205 | 7 | 6.5 | 60.0 | 69.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | | | |
| 14 FT | 16 | 18 | 15 | 13 | 6 | 7 | 6 | 6 | 77.5 | 40.0 | 40.0 | 40.0 | 7 | 14 | 71.0 | 77.0 | 7 | 14 | 48.0 | 49.0 | 6 | 6.5 | 6 | 6.5 | 73.0 | 182 | 194 | 206 | 7 | 6.5 | 60.0 | 69.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | |
| 16 FT | 18 | 20 | 15 | 13 | 6 | 7 | 7 | 8 | 81.9 | 42.0 | 42.0 | 42.0 | 7 | 15 | 70.0 | 77.0 | 7 | 15 | 48.0 | 50.0 | 6 | 6 | 6 | 6 | 72.4 | 184 | 196 | 208 | 7 | 7 | 60.0 | 69.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | |
| 18 FT | 19 | 21 | 15 | 13 | 6 | 6.5 | 7 | 7 | 80.8 | 43.0 | 43.0 | 49.0 | 7 | 14 | 69.0 | 77.0 | 7 | 14 | 48.0 | 50.0 | 7 | 8 | 7 | 7 | 74.4 | 185 | 197 | 209 | 7 | 6.5 | 60.0 | 69.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | |
| 20 FT | 20 | 23 | 16 | 13 | 6 | 6 | 7 | 7 | 80.3 | 44.0 | 44.0 | 50.0 | 7 | 14 | 69.0 | 76.0 | 7 | 14 | 47.0 | 50.0 | 7 | 7 | 7 | 7.5 | 74.0 | 187 | 199 | 211 | 7 | 7 | 59.0 | 70.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | | | |
| 22 FT | 22 | 24 | 17 | 13 | 6 | 6 | 7 | 7.5 | 80.1 | 46.0 | 46.0 | 52.0 | 7 | 14 | 68.0 | 76.0 | 7 | 14 | 47.0 | 50.0 | 7 | 7 | 7 | 7.5 | 73.3 | 188 | 200 | 212 | 7 | 6.5 | 59.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 24 FT | 23 | 25 | 17 | 13 | 7 | 7.5 | 7 | 7 | 79.4 | 47.0 | 47.0 | 53.0 | 7 | 14 | 67.0 | 76.0 | 7 | 14 | 47.0 | 50.0 | 7 | 6 | 7 | 7 | 72.5 | 189 | 201 | 213 | 7 | 6 | 59.0 | 70.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 26 FT | 25 | 27 | 18 | 13 | 7 | 7 | 7 | 7 | 79.6 | 49.0 | 49.0 | 55.0 | 7 | 14 | 67.0 | 76.0 | 7 | 14 | 47.0 | 50.0 | 7 | 6.5 | 7 | 7.5 | 72.5 | 191 | 203 | 215 | 7 | 6 | 59.0 | 70.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | | | | | | | |
| 28 FT | 26 | 29 | 19 | 13 | 7 | 7 | 7 | 7 | 79.6 | 50.0 | 50.0 | 50.0 | 7 | 13 | 66.0 | 76.0 | 7 | 13 | 46.0 | 50.0 | 7 | 6 | 6 | 6 | 69.5 | 193 | 205 | 217 | 8 | 7.5 | 65.0 | 76.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 30 FT | 27 | 30 | 19 | 13 | 7 | 6.5 | 7 | 6.5 | 79.3 | 51.0 | 51.0 | 57.0 | 7 | 13 | 66.0 | 76.0 | 7 | 13 | 46.0 | 49.0 | 8 | 7.5 | 7 | 7.5 | 72.1 | 194 | 206 | 218 | 8 | 7.5 | 65.0 | 77.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 32 FT | 29 | 31 | 20 | 13 | 7 | 6 | 7 | 7 | 79.5 | 53.0 | 53.0 | 59.0 | 7 | 12 | 65.0 | 75.0 | 7 | 12 | 44.0 | 47.0 | 8 | 7 | 7 | 8 | 71.9 | 195 | 207 | 219 | 8 | 7 | 65.0 | 77.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | | | | | | | |
| 34 FT | 30 | 33 | 21 | 13 | 7 | 6 | 7 | 7 | 79.9 | 54.0 | 54.0 | 54.0 | 7 | 12 | 65.0 | 75.0 | 7 | 12 | 44.0 | 47.0 | 8 | 7 | 6 | 6 | 69.0 | 197 | 209 | 221 | 8 | 6.5 | 65.0 | 77.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | |
| 36 FT | 31 | 34 | 22 | 13 | 8 | 7.5 | 7 | 6.5 | 80.1 | 55.0 | 61.0 | 61.0 | 8 | 15 | 73.0 | 82.0 | 8 | 15 | 52.0 | 55.0 | 8 | 7 | 7 | 7.5 | 71.9 | 198 | 210 | 222 | 8 | 6.5 | 65.0 | 77.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | |
| 38 FT | 32 | 35 | 22 | 13 | 8 | 7 | 7 | 6 | 79.8 | 56.0 | 62.0 | 62.0 | 8 | 14 | 73.0 | 82.0 | 8 | 14 | 52.0 | 54.0 | 8 | 6.5 | 7 | 7.5 | 71.6 | 199 | 211 | 223 | 8 | 6.5 | 65.0 | 77.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | |
| 40 FT | 33 | 36 | 23 | 13 | 8 | 6.5 | 7 | 6.5 | 80.4 | 57.0 | 63.0 | 63.0 | 8 | 13 | 73.0 | 82.0 | 8 | 13 | 51.0 | 54.0 | 8 | 6 | 7 | 7.5 | 71.8 | 200 | 212 | 224 | 8 | 6 | 65.0 | 77.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 42 FT | 34 | 38 | 24 | 13 | 8 | 6.5 | 7 | 6.5 | 81.1 | 58.0 | 64.0 | 64.0 | 8 | 13 | 72.0 | 81.0 | 8 | 13 | 51.0 | 53.0 | 8 | 6.5 | 7 | 7 | 72.4 | 202 | 214 | 226 | 8 | 6 | 65.0 | 78.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 44 FT | 35 | 39 | 25 | 13 | 8 | 6.5 | 7 | 6.5 | 81.9 | 59.0 | 65.0 | 65.0 | 8 | 13 | 72.0 | 81.0 | 8 | 13 | 50.0 | 52.0 | 8 | 6.5 | 7 | 7 | 72.5 | 203 | 215 | 227 | 8 | 6 | 65.0 | 78.0 | 5 | 12 | 7 | 7.5 | 0 | | | | | | | | | | | | | | | | |
| 46 FT | 36 | 40 | 26 | 13 | 8 | 6.5 | 7 | 6.5 | 82.5 | 60.0 | 66.0 | 66.0 | 8 | 13 | 72.0 | 80.0 | 8 | 13 | 50.0 | 52.0 | 8 | 6.5 | 7 | 7 | 72.9 | 204 | 216 | 228 | 9 | 7.5 | 71.0 | 84.0 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | | |
| 48 FT | 37 | 41 | 27 | 13 | 8 | 6.5 | 7 | 6 | 83.3 | 67.0 | 67.0 | 67.0 | 8 | 12 | 72.0 | 79.0 | 8 | 12 | 49.0 | 51.0 | 8 | 6.5 | 7 | 7 | 73.1 | 205 | 217 | 229 | 9 | 7 | 71.0 | 84.0 | 5 | 12 | 7 | 8 | 0 | | | | | | | | | | | | | | | | |
| 50 FT | 38 | 42 | 27 | 13 | 8 | 6 | 7 | 6.5 | 81.8 | 68.0 | 68.0 | 68.0 | 8 | 12 | 71.0 | 79.0 | 8 | 12 | 49.0 | 50.0 | 8 | 6 | 7 | 7 | 71.4 | 206 | 218 | 230 | 9 | 7 | 71.0 | 84.0 | 5 | 12 | 6 | 6 | 0 | | | | | | | | | | | | | | | | |



GENERAL NOTES:


IF DESIGN FILL IS BETWEEN TABULATED DESIGN FILLS, USE THE NEXT GREATER TABULATED DESIGN FILL, EXCEPT FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET. FOR DESIGN FILLS BETWEEN 2 FEET AND 4 FEET USE THE GREATER MEMBER THICKNESS, AREA OF REINFORCEMENT AND BAR DIMENSIONS FROM THE 2 FEET AND 4 FEET TABULATED DESIGN FILLS. AREA OF REINFORCEMENT EQUALS BAR AREA PER FOOT SPACING.

SPECIAL DESIGNS ARE REQUIRED WHEN THE DESIGN FILL IS LESS THAN 1 FOOT OR GREATER THAN 50 FEET.

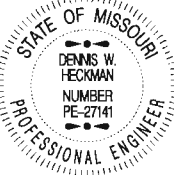
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

DESIGN FILLS ARE MEASURED FROM THE TOP OF TOP SLAB TO THE TOP OF EARTH FILL OR ROADWAY.

CULVERTS MEET STRENGTH AND SERVICEABILITY REQUIREMENTS FOR THE DESIGN VEHICULAR LIVE LOAD HL-93 MINUS THE LANE LOAD.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



CONCRETE TRIPLE BOX CULVERT
MEMBER THICKNESS
BAR SIZE, SPACING & DIMENSIONS
SPAN (S): 15 FEET
HEIGHT (HT): 14 THRU 16 FEET

DATE EFFECTIVE: 12/01/2011
DATE PREPARED: 9/29/2011

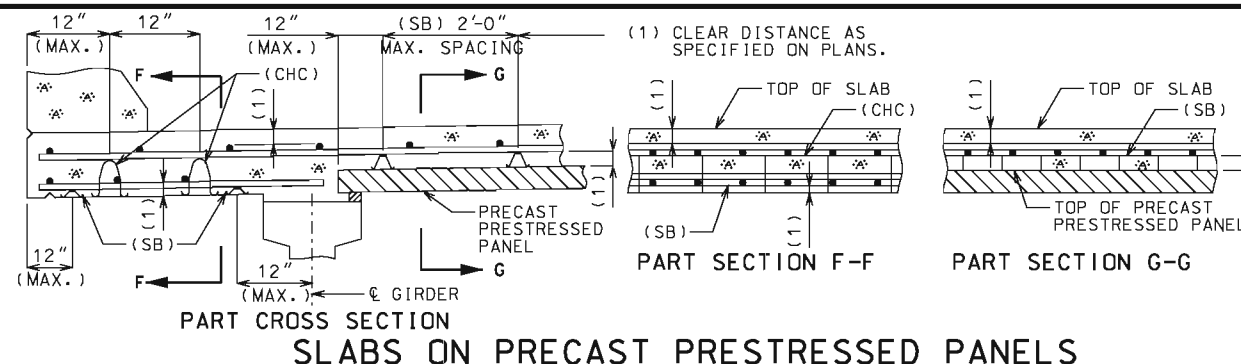
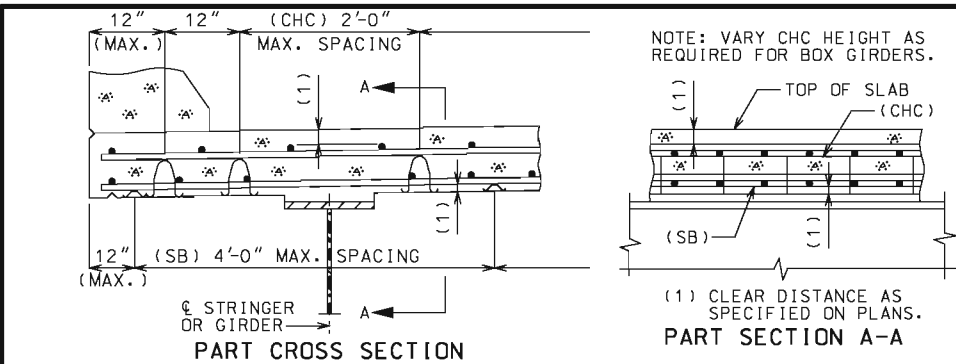
703.87

SHEET NO.
25 OF 27

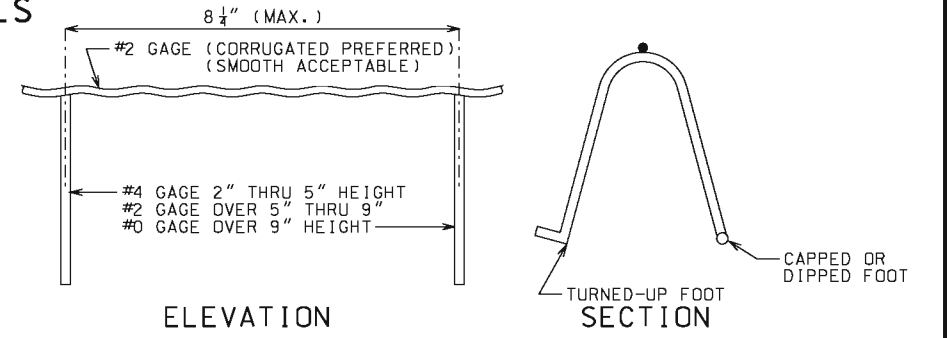
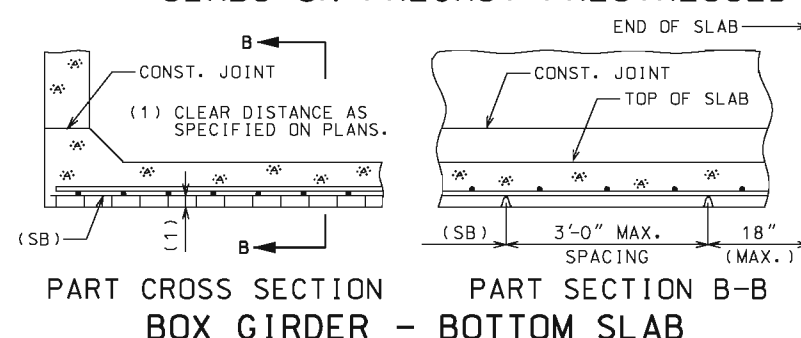
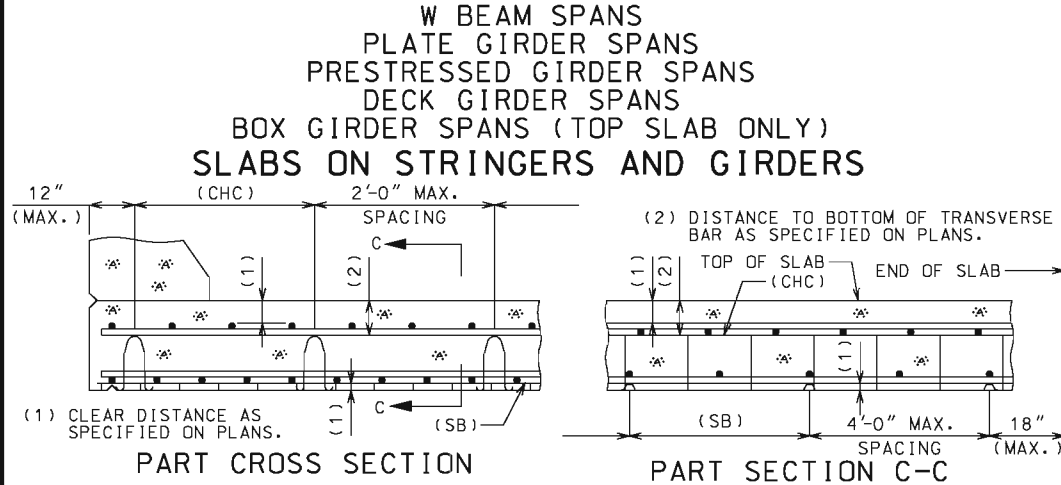
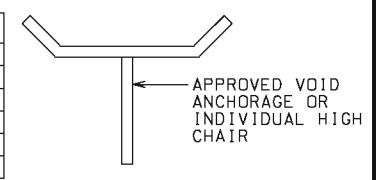
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 8 FT OR 9 FT OR 10 FT | | | | | | | | | | | | | | | | | | | |
|------------------|------------------|----|----|----|---------------|------|---------|------|------|-------|-------|--------|---------|------|-------|-------|---------|------|------|------|------------------|------|---------|------|------|-------|-------|--------|---------|------|------|-------------------------------------|---------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | | | | | |
| | TS | BS | TX | T1 | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | | | | | |
| | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | HT=8' | HT=9' | HT=10' | | | | | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 10 | 9 | 8 | 6 | 7.5 | 5 | 8 | 77.1 | 35.0 | 35.0 | 35.0 | 6 | 16 | 154.5 | 117.5 | 6 | 16 | 52.0 | 57.0 | 5 | 7 | 6 | 6 | 64.6 | 102 | 114 | 126 | 7 | 6.5 | 66.0 | 71.0 | 5 | 12 | 5 | 12 | 2 | | | | | | | | | | | | | | |
| 2 FT | 16 | 11 | 9 | 8 | 6 | 7 | 5 | 8 | 77.1 | 36.0 | 36.0 | 36.0 | 6 | 14 | 154.5 | 117.5 | 6 | 14 | 48.0 | 53.0 | 5 | 6.5 | 6 | 6.5 | 59.3 | 103 | 115 | 127 | 7 | 7 | 65.0 | 71.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 4 FT | 13 | 11 | 9 | 8 | 6 | 6.5 | 5 | 6 | 55.9 | 33.0 | 33.0 | 33.0 | 6 | 12 | 87.0 | 115.0 | 6 | 12 | 42.0 | 45.0 | 6 | 8 | 6 | 6 | 54.0 | 103 | 115 | 127 | 7 | 6 | 64.0 | 71.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 6 FT | 13 | 12 | 10 | 8 | 6 | 7 | 5 | 6 | 51.4 | 33.0 | 33.0 | 33.0 | 7 | 15 | 75.0 | 91.0 | 7 | 15 | 42.0 | 45.0 | 6 | 7 | 6 | 6.5 | 51.4 | 104 | 116 | 128 | 7 | 6 | 62.0 | 70.0 | 5 | 12 | 5 | 12 | 12 | | | | | | | | | | | | | | |
| 8 FT | 14 | 14 | 10 | 8 | 6 | 7 | 5 | 6 | 47.3 | 34.0 | 34.0 | 34.0 | 7 | 15 | 70.0 | 81.0 | 7 | 15 | 41.0 | 43.0 | 6 | 7.5 | 5 | 6.5 | 44.5 | 106 | 118 | 130 | 7 | 6 | 61.0 | 71.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 10 FT | 15 | 16 | 10 | 8 | 6 | 6.5 | 6 | 8 | 53.6 | 35.0 | 35.0 | 35.0 | 7 | 14 | 75.0 | 85.0 | 7 | 14 | 48.0 | 51.0 | 6 | 7 | 5 | 7 | 41.6 | 108 | 120 | 132 | 7 | 6.5 | 60.0 | 72.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 12 FT | 16 | 17 | 10 | 8 | 6 | 6.5 | 6 | 8 | 51.3 | 36.0 | 36.0 | 36.0 | 7 | 13 | 73.0 | 83.0 | 7 | 13 | 47.0 | 50.0 | 6 | 6.5 | 5 | 6.5 | 40.1 | 109 | 121 | 133 | 7 | 6 | 60.0 | 72.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 14 FT | 18 | 19 | 10 | 8 | 6 | 6 | 6 | 8 | 49.0 | 38.0 | 38.0 | 38.0 | 7 | 14 | 71.0 | 83.0 | 7 | 14 | 47.0 | 50.0 | 6 | 6 | 5 | 6.5 | 38.8 | 111 | 123 | 135 | 7 | 6.5 | 59.0 | 73.0 | 5 | 12 | 5 | 12 | 0 | | | | | | | | | | | | | | |
| 16 FT | 19 | 20 | 10 | 8 | 6 | 6 | 6 | 7.5 | 47.6 | 39.0 | 39.0 | 39.0 | 7 | 13 | 69.0 | 82.0 | 7 | 13 | 46.0 | 50.0 | 6 | 6 | 5 | 6.5 | 37.8 | 112 | 124 | 136 | 7 | 6 | 59.0 | 73.0 | 5 | 12 | 5 | 11 | 0 | | | | | | | | | | | | | | |
| 18 FT | 20 | 22 | 10 | 8 | 7 | 7 | 6 | 7.5 | 46.9 | 40.0 | 40.0 | 40.0 | 7 | 13 | 69.0 | 81.0 | 7 | 13 | 46.0 | 50.0 | 7 | 7.5 | 5 | 6.5 | 36.8 | 114 | 126 | 138 | 7 | 6.5 | 59.0 | 73.0 | 5 | 12 | 5 | 9.5 | 0 | | | | | | | | | | | | | | |
| 20 FT | 22 | 23 | 10 | 8 | 7 | 7.5 | 6 | 7.5 | 45.6 | 42.0 | 42.0 | 42.0 | 7 | 13 | 68.0 | 81.0 | 7 | 13 | 46.0 | 50.0 | 7 | 6.5 | 5 | 6 | 36.5 | 115 | 127 | 139 | 7 | 6 | 59.0 | 73.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 22 FT | 24 | 25 | 10 | 8 | 7 | 7.5 | 6 | 7.5 | 45.0 | 44.0 | 44.0 | 44.0 | 7 | 13 | 67.0 | 81.0 | 7 | 13 | 46.0 | 50.0 | 7 | 6.5 | 5 | 6 | 36.3 | 117 | 129 | 141 | 7 | 6.5 | 59.0 | 73.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | | | | | |
| 24 FT | 25 | 27 | 11 | 8 | 7 | 7 | 6 | 7.5 | 45.9 | 45.0 | 45.0 | 45.0 | 7 | 12 | 67.0 | 80.0 | 7 | 12 | 46.0 | 50.0 | 7 | 6.5 | 5 | 6 | 36.4 | 119 | 131 | 143 | 7 | 6 | 59.0 | 73.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 26 FT | 27 | 28 | 11 | 8 | 7 | 6.5 | 6 | 7.5 | 45.1 | 47.0 | 47.0 | 47.0 | 7 | 12 | 66.0 | 80.0 | 7 | 12 | 45.0 | 50.0 | 7 | 6 | 5 | 6 | 36.4 | 120 | 132 | 144 | 7 | 6 | 59.0 | 73.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 28 FT | 28 | 30 | 11 | 8 | 7 | 6 | 6 | 7 | 45.0 | 52.0 | 52.0 | 52.0 | 7 | 12 | 66.0 | 80.0 | 7 | 12 | 45.0 | 50.0 | 8 | 7.5 | 6 | 7 | 39.0 | 122 | 134 | 146 | 8 | 7.5 | 65.0 | 79.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 30 FT | 30 | 31 | 11 | 8 | 7 | 6 | 6 | 6.5 | 44.6 | 54.0 | 54.0 | 54.0 | 7 | 12 | 66.0 | 79.0 | 7 | 12 | 44.0 | 48.0 | 8 | 7 | 6 | 7 | 39.0 | 123 | 135 | 147 | 8 | 7 | 65.0 | 79.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | | | | | |
| 32 FT | 31 | 33 | 12 | 8 | 8 | 7.5 | 6 | 7.5 | 45.5 | 55.0 | 55.0 | 55.0 | 8 | 15 | 74.0 | 87.0 | 8 | 15 | 52.0 | 56.0 | 8 | 7 | 6 | 7 | 39.4 | 125 | 137 | 149 | 8 | 6.5 | 65.0 | 80.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | |
| 34 FT | 33 | 34 | 12 | 8 | 8 | 7 | 6 | 7 | 45.3 | 57.0 | 57.0 | 57.0 | 8 | 14 | 73.0 | 86.0 | 8 | 14 | 51.0 | 54.0 | 8 | 6.5 | 6 | 7 | 39.5 | 126 | 138 | 150 | 8 | 6.5 | 65.0 | 80.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | | | | | |
| 36 FT | 34 | 36 | 12 | 8 | 8 | 7 | 6 | 6.5 | 45.3 | 58.0 | 58.0 | 58.0 | 8 | 14 | 73.0 | 85.0 | 8 | 14 | 50.0 | 53.0 | 8 | 6.5 | 6 | 6.5 | 39.4 | 128 | 140 | 152 | 8 | 6 | 65.0 | 80.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | |
| 38 FT | 35 | 37 | 12 | 8 | 8 | 6.5 | 6 | 6.5 | 45.3 | 59.0 | 59.0 | 59.0 | 8 | 13 | 73.0 | 85.0 | 8 | 13 | 50.0 | 53.0 | 8 | 6.5 | 6 | 6.5 | 39.4 | 129 | 141 | 153 | 8 | 6 | 65.0 | 80.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | |
| 40 FT | 36 | 39 | 13 | 8 | 8 | 6 | 6 | 6.5 | 46.1 | 60.0 | 60.0 | 60.0 | 8 | 12 | 73.0 | 84.0 | 8 | 12 | 50.0 | 52.0 | 8 | 6.5 | 6 | 6 | 39.9 | 131 | 143 | 155 | 8 | 6 | 65.0 | 80.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | | | | | |
| 42 FT | 38 | 40 | 13 | 8 | 8 | 6 | 6 | 6 | 46.0 | 62.0 | 62.0 | 62.0 | 8 | 12 | 72.0 | 83.0 | 8 | 12 | 48.0 | 50.0 | 8 | 6.5 | 6 | 6 | 40.1 | 132 | 144 | 156 | 9 | 7 | 71.0 | 86.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | | | | | |
| 44 FT | 39 | 41 | 13 | 8 | 8 | 6 | 6 | 6 | 46.0 | 63.0 | 63.0 | 63.0 | 8 | 12 | 72.0 | 82.0 | 8 | 12 | 48.0 | 49.0 | 8 | 6 | 7 | 7 | 43.3 | 133 | 145 | 157 | 9 | 7 | 71.0 | 86.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | | | | | |
| 46 FT | 40 | 42 | 13 | 8 | 8 | 6 | 7 | 7 | 51.1 | 70.0 | 70.0 | 70.0 | 8 | 12 | 72.0 | 82.0 | 8 | 12 | 47.0 | 48.0 | 8 | 6 | 7 | 7 | 43.4 | 134 | 146 | 158 | 9 | 7 | 71.0 | 86.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | |
| 48 FT | 41 | 43 | 13 | 8 | 9 | 7.5 | 7 | 7 | 51.1 | 71.0 | 71.0 | 71.0 | 9 | 15 | 79.0 | 89.0 | 9 | 15 | 55.0 | 56.0 | 8 | 6 | 7 | 6.5 | 43.5 | 135 | 147 | 159 | 9 | 7 | 70.0 | 86.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | | | | | |
| 50 FT | 42 | 45 | 13 | 8 | 9 | 7 | 7 | 6 | 51.4 | 72.0 | 72.0 | 72.0 | 9 | 15 | 79.0 | 88.0 | 9 | 15 | 55.0 | 56.0 | 8 | 6 | 7 | 6.5 | 43.8 | 137 | 149 | 161 | 9 | 7 | 70.0 | 86.0 | 5 | 10.5 | 6 | 7 | 0 | | | | | | | | | | | | | | |

| SPAN (S) = 16 FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | HEIGHT (HT) = 11 FT OR 12 FT OR 13 FT | | | | | | | | | | | | | | | |
|------------------|---------------------|----|----|----|---------------|------|---------|------|------|--------|--------|--------|---------|------|-------|-------|---------|------|------|------|------------------|------|---------|------|------|--------|--------|--------|---------|------|------|---------------------------------------|---------|------|---------|------|-----------|--|--|--|--|--|--|--|--|--|--|
| DESIGN FILL | MEMBER THICKNESS | | | | TOP SLAB BARS | | | | | | | | | | | | | | | | BOTTOM SLAB BARS | | | | | | | | | | | | | | | | WALL BARS | | | | | | | | | | |
| | | | | | A1 BARS | | J3 BARS | | | | | | H1 BARS | | | | H2 BARS | | | | A2 BARS | | J4 BARS | | | | | | H3 BARS | | | | B1 BARS | | B2 BARS | | | | | | | | | | | | |
| | TS | BS | TX | TI | SIZE | SPA. | SIZE | SPA. | C1 | K2 | | | SIZE | SPA. | C5 | O8 | SIZE | SPA. | C6 | Q9 | SIZE | SPA. | SIZE | SPA. | C4 | K3 | | | SIZE | SPA. | C7 | Q10 | SIZE | SPA. | SIZE | SPA. | G1 | | | | | | | | | | |
| | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | HT=11' | HT=12' | HT=13' | | | | | | | | | | | | | | | | | | | |
| 1 FT | 15 | 11 | 9 | 10 | 6 | 7.5 | 5 | 6 | 77.5 | 35.0 | 35.0 | 35.0 | 6 | 16 | 155.5 | 118.5 | 6 | 16 | 52.0 | 57.0 | 5 | 6.5 | 6 | 6 | 87.6 | 139 | 151 | 163 | 6 | 6 | 65.0 | 69.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | |
| 2 FT | 16 | 12 | 9 | 10 | 6 | 7 | 5 | 6 | 77.5 | 36.0 | 36.0 | 36.0 | 6 | 14 | 155.5 | 118.5 | 6 | 14 | 49.0 | 54.0 | 5 | 6 | 6 | 6 | 79.0 | 140 | 152 | 164 | 6 | 6 | 64.0 | 69.0 | 5 | 12 | 5 | 8.5 | 12 | | | | | | | | | | |
| 4 FT | 13 | 12 | 10 | 10 | 6 | 6.5 | 6 | 7 | 76.3 | 37.0 | 37.0 | 37.0 | 6 | 12 | 91.0 | 115.0 | 6 | 12 | 42.0 | 45.0 | 5 | 6 | 6 | 6 | 69.6 | 140 | 152 | 164 | 7 | 6.5 | 65.0 | 72.0 | 5 | 10.5 | 5 | 8 | 12 | | | | | | | | | | |
| 6 FT | 13 | 13 | 10 | 10 | 6 | 6.5 | 6 | 7 | 67.3 | 37.0 | 37.0 | 37.0 | 7 | 15 | 77.0 | 88.0 | 7 | 15 | 43.0 | 45.0 | 6 | 7.5 | 6 | 6.5 | 64.3 | 141 | 153 | 165 | 7 | 6 | 64.0 | 72.0 | 5 | 12 | 5 | 8 | 12 | | | | | | | | | | |
| 8 FT | 14 | 14 | 10 | 10 | 6 | 7 | 6 | 6.5 | 61.5 | 38.0 | 38.0 | 38.0 | 7 | 15 | 71.0 | 79.0 | 7 | 15 | 41.0 | 44.0 | 6 | 7 | 6 | 6 | 60.3 | 142 | 154 | 166 | 7 | 6 | 62.0 | 72.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 10 FT | 15 | 16 | 10 | 10 | 6 | 6.5 | 6 | 6 | 63.9 | 35.0 | 39.0 | 39.0 | 7 | 14 | 76.0 | 85.0 | 7 | 14 | 49.0 | 51.0 | 6 | 6.5 | 6 | 6 | 57.6 | 144 | 156 | 168 | 7 | 6.5 | 61.0 | 72.0 | 5 | 12 | 5 | 8 | 0 | | | | | | | | | | |
| 12 FT | 16 | 18 | 11 | 10 | 6 | 6.5 | 6 | 6 | 62.9 | 36.0 | 40.0 | 40.0 | 7 | 14 | 74.0 | 83.0 | 7 | 14 | 48.0 | 51.0 | 6 | 6.5 | 6 | 7 | 56.4 | 146 | 158 | 170 | 7 | 6.5 | 61.0 | 73.0 | 5 | 12 | 5 | 7.5 | 0 | | | | | | | | | | |
| 14 FT | 18 | 19 | 12 | 10 | 6 | 6.5 | 6 | 6.5 | 61.8 | 38.0 | 42.0 | 42.0 | 7 | 14 | 72.0 | 82.0 | 7 | 14 | 48.0 | 51.0 | 6 | 6 | 6 | 7 | 55.8 | 147 | 159 | 171 | 7 | 6.5 | 61.0 | 73.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | |
| 16 FT | 19 | 21 | 12 | 10 | 6 | 6 | 6 | 6 | 60.8 | 39.0 | 43.0 | 43.0 | 7 | 13 | 71.0 | 81.0 | 7 | 13 | 47.0 | 51.0 | 7 | 8 | 6 | 7 | 54.6 | 149 | 161 | 173 | 7 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | |
| 18 FT | 20 | 22 | 12 | 10 | 7 | 8 | 7 | 8 | 64.6 | 40.0 | 44.0 | 44.0 | 7 | 13 | 70.0 | 81.0 | 7 | 13 | 47.0 | 51.0 | 7 | 7.5 | 6 | 6 | 53.8 | 150 | 162 | 174 | 7 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 7 | 0 | | | | | | | | | | |
| 20 FT | 22 | 24 | 13 | 10 | 7 | 8 | 6 | 6 | 59.6 | 42.0 | 46.0 | 46.0 | 7 | 13 | 69.0 | 81.0 | 7 | 13 | 47.0 | 51.0 | 7 | 7 | 6 | 7 | 53.6 | 152 | 164 | 176 | 7 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 22 FT | 23 | 25 | 14 | 10 | 7 | 7 | 6 | 6 | 59.8 | 43.0 | 47.0 | 47.0 | 7 | 12 | 69.0 | 80.0 | 7 | 12 | 47.0 | 50.0 | 7 | 6.5 | 6 | 7 | 53.5 | 153 | 165 | 177 | 7 | 6.5 | 60.0 | 73.0 | 5 | 12 | 5 | 6.5 | 0 | | | | | | | | | | |
| 24 FT | 25 | 27 | 14 | 10 | 7 | 7 | 6 | 6 | 59.1 | 45.0 | 49.0 | 49.0 | 7 | 13 | 68.0 | 80.0 | 7 | 13 | 46.0 | 50.0 | 7 | 6.5 | 6 | 7 | 53.3 | 155 | 167 | 179 | 7 | 6 | 60.0 | 74.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | |
| 26 FT | 27 | 29 | 14 | 10 | 7 | 6.5 | 6 | 6 | 58.6 | 51.0 | 51.0 | 51.0 | 7 | 13 | 67.0 | 80.0 | 7 | 13 | 46.0 | 50.0 | 7 | 6 | 6 | 7 | 53.0 | 157 | 169 | 181 | 8 | 7.5 | 66.0 | 80.0 | 5 | 12 | 5 | 6 | 0 | | | | | | | | | | |
| 28 FT | 28 | 30 | 15 | 10 | 7 | 6.5 | 6 | 6 | 59.1 | 52.0 | 52.0 | 52.0 | 7 | 12 | 67.0 | 79.0 | 7 | 12 | 46.0 | 50.0 | 8 | 7.5 | 6 | 7 | 53.1 | 158 | 170 | 182 | 8 | 7.5 | 66.0 | 80.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 30 FT | 30 | 32 | 15 | 10 | 7 | 6 | 6 | 6 | 58.8 | 54.0 | 54.0 | 54.0 | 7 | 12 | 67.0 | 79.0 | 7 | 12 | 45.0 | 48.0 | 8 | 7 | 6 | 7 | 53.0 | 160 | 172 | 184 | 8 | 7 | 66.0 | 80.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 32 FT | 31 | 33 | 15 | 10 | 8 | 7.5 | 7 | 7 | 63.4 | 55.0 | 55.0 | 55.0 | 8 | 15 | 74.0 | 87.0 | 8 | 15 | 53.0 | 56.0 | 8 | 7 | 6 | 7 | 52.8 | 161 | 173 | 185 | 8 | 6.5 | 66.0 | 80.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 34 FT | 32 | 34 | 16 | 10 | 8 | 7 | 7 | 7.5 | 63.9 | 56.0 | 56.0 | 56.0 | 8 | 14 | 74.0 | 86.0 | 8 | 14 | 52.0 | 56.0 | 8 | 6 | 6 | 7 | 52.9 | 162 | 174 | 186 | 8 | 6 | 66.0 | 80.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 36 FT | 34 | 36 | 16 | 10 | 8 | 7 | 7 | 7.5 | 63.8 | 58.0 | 58.0 | 58.0 | 8 | 14 | 74.0 | 85.0 | 8 | 14 | 51.0 | 54.0 | 8 | 6.5 | 6 | 6.5 | 52.9 | 164 | 176 | 188 | 8 | 6 | 66.0 | 80.0 | 5 | 12 | 6 | 8 | 0 | | | | | | | | | | |
| 38 FT | 35 | 37 | 17 | 10 | 8 | 6.5 | 7 | 7.5 | 64.4 | 59.0 | 59.0 | 59.0 | 8 | 13 | 74.0 | 85.0 | 8 | 13 | 51.0 | 53.0 | 8 | 6 | 6 | 6.5 | 53.1 | 165 | 177 | 189 | 8 | 6 | 66.0 | 80.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | |
| 40 FT | 36 | 39 | 17 | 10 | 8 | 6.5 | 7 | 7 | 64.4 | 60.0 | 60.0 | 60.0 | 8 | 13 | 73.0 | 84.0 | 8 | 13 | 50.0 | 53.0 | 8 | 6.5 | 6 | 6 | 53.1 | 167 | 179 | 191 | 8 | 6 | 66.0 | 80.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | |
| 42 FT | 37 | 40 | 17 | 10 | 8 | 6 | 7 | 6.5 | 64.3 | 61.0 | 61.0 | 61.0 | 8 | 12 | 73.0 | 84.0 | 8 | 12 | 50.0 | 52.0 | 8 | 6 | 6 | 6 | 53.1 | 168 | 180 | 192 | 9 | 7 | 72.0 | 86.0 | 5 | 12 | 6 | 7.5 | 0 | | | | | | | | | | |
| 44 FT | 38 | 41 | 18 | 10 | 8 | 6 | 7 | 7 | 65.0 | 62.0 | 62.0 | 68.0 | 8 | 12 | 73.0 | 83.0 | 8 | 12 | 49.0 | 51.0 | 8 | 6 | 7 | 8 | 56.6 | 169 | 181 | 193 | 9 | 7 | 72.0 | 86.0 | 5 | 12 | 6 | 7 | 0 | | | | | | | | | | |
| 46 FT | 39 | 43 | 19 | 10 | 8 | 6 | 7 | 7.5 | 66.0 | 63.0 | 63.0 | 69.0 | 8 | 12 | 73.0 | 82.0 | 8 | 12 | 49.0 | 51.0 | 8 | 6 | 7 | 7.5 | 57.1 | 171 | 183 | 195 | 9 | 7 | 72.0 | 87.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |
| 48 FT | 40 | 44 | 19 | 10 | 8 | 6 | 7 | 6.5 | 66.0 | 70.0 | 70.0 | 70.0 | 8 | 12 | 72.0 | 81.0 | 8 | 12 | 48.0 | 50.0 | 8 | 6 | 7 | 7 | 57.3 | 172 | 184 | 196 | 9 | 7 | 72.0 | 87.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |
| 50 FT | 41 | 45 | 20 | 10 | 9 | 7.5 | 7 | 7 | 66.9 | 71.0 | 71.0 | 71.0 | 9 | 15 | 80.0 | 88.0 | 9 | 15 | 56.0 | 57.0 | 8 | 6 | 7 | 7 | 57.6 | 173 | 185 | 197 | 9 | 6.5 | 72.0 | 87.0 | 5 | 12 | 6 | 6.5 | 0 | | | | | | | | | | |



| VOIDS | MAX. SPACING |
|------------|--------------|
| 14" & LESS | 4'-0" |
| 16" & 17" | 3'-0" |
| 19" | 2'-6" |
| 21" | 2'-0" |
| 22" | 2'-0" |
| 23" & UP | 18" |



ELEVATION CONTINUOUS HIGH CHAIR - CHC

ALL CONTACT POINTS ON WIRE BAR SUPPORTS SHALL BE SECURELY WELDED.

A TURNED-UP, CAPPED OR DIPPED FOOT SHALL BE ON ALL BAR SUPPORTS BEARING ON FORMS. WHERE BAR SUPPORTS ARE USED ON EARTH OR AGGREGATE SUBGRADES, SUITABLE PLATES, CONTINUOUS BARS OR PRECAST CONCRETE BAR SUPPORTS SHALL BE PROVIDED TO PREVENT DISPLACEMENT OF THE SUPPORT FOOT.

ALL DIMENSIONS TO REINFORCING STEEL ARE TO € BAR EXCEPT WHERE CLEAR DISTANCE FROM FACE OF CONCRETE IS INDICATED. HEIGHT OF BAR SUPPORTS TO BE THAT REQUIRED TO SUPPORT BARS IN EXACT POSITIONS SHOWN ON PLANS.

SPIRAL REINFORCING SHALL BE SUPPORTED BY USE OF APPROVED SPIRAL SPACERS AT NOT MORE THAN 3'-0" CENTERS. PAYMENT FOR SPACERS AND ALL OTHER BAR SUPPORTS WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.

WHEN BARS OF DIFFERENT SIZES ARE USED IN THE SAME MEMBERS, THE SELECTION OF BAR SUPPORTS SHALL BE BASED ON THE LARGER SIZE.

SUPPORTS FOR THE UPPER LAYERS NEED NOT BE DIRECTLY OVER THE SUPPORTS BELOW.

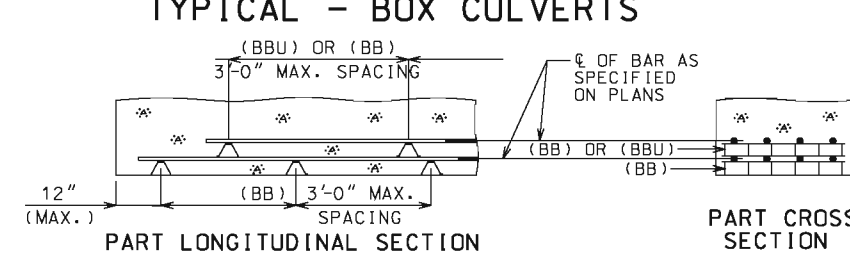
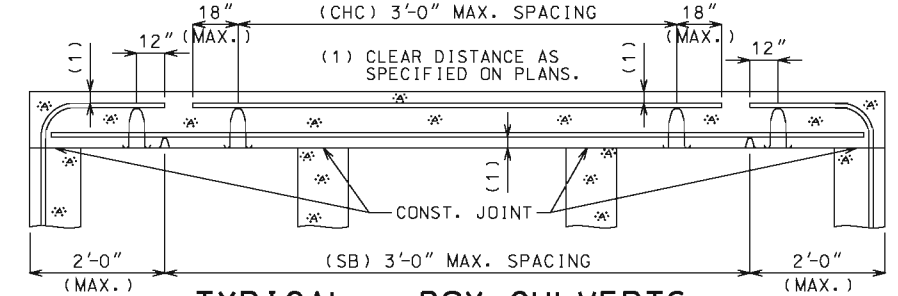
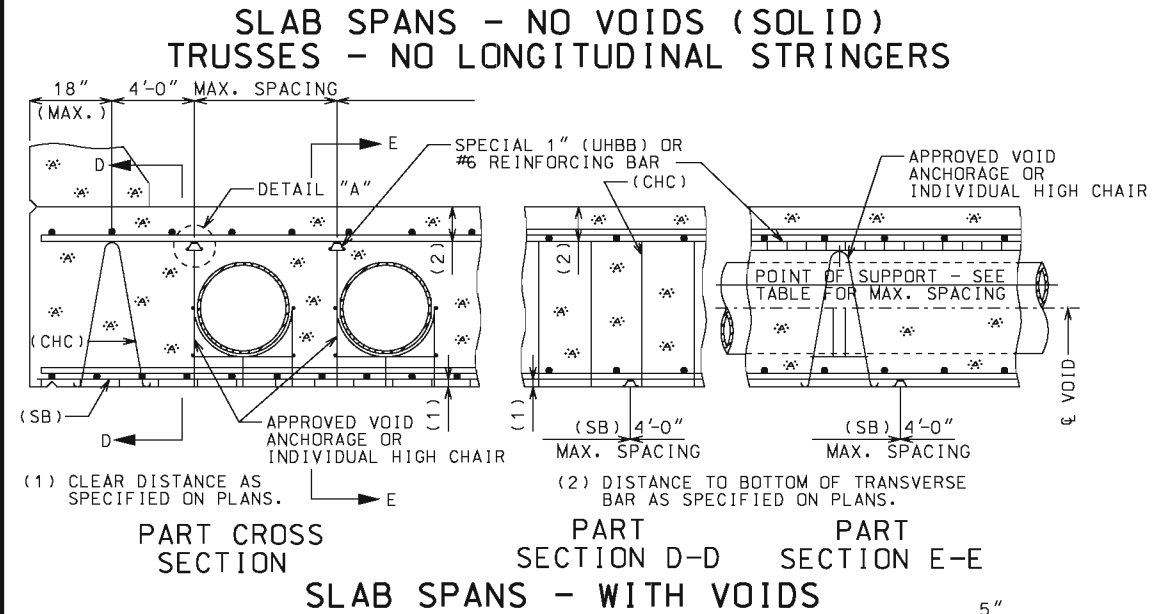
ALL BAR SUPPORTS SHALL BE IN ACCORDANCE WITH C.R.S.I. MANUAL OF STANDARD PRACTICE, EXCEPT AS SHOWN.

WIRE BAR AND REINFORCING BAR SUPPORTS USED WITH EPOXY COATED REINFORCING STEEL SHALL BE COATED ENTIRELY WITH AN EPOXY OR PLASTIC MATERIAL.

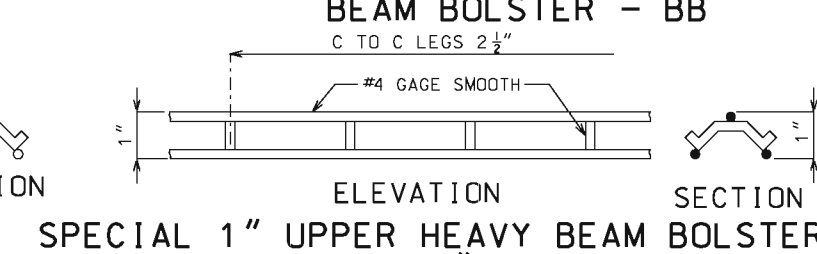
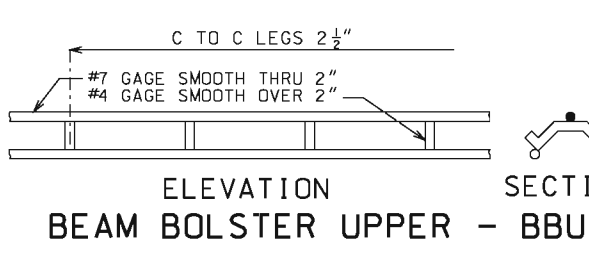
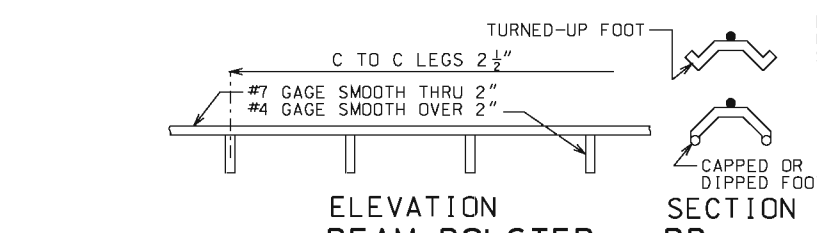
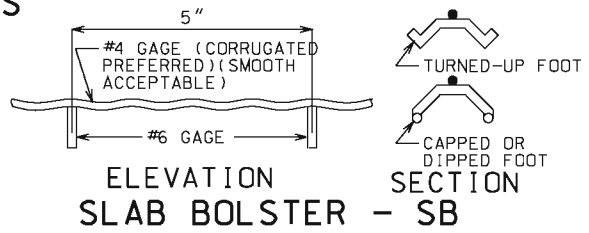
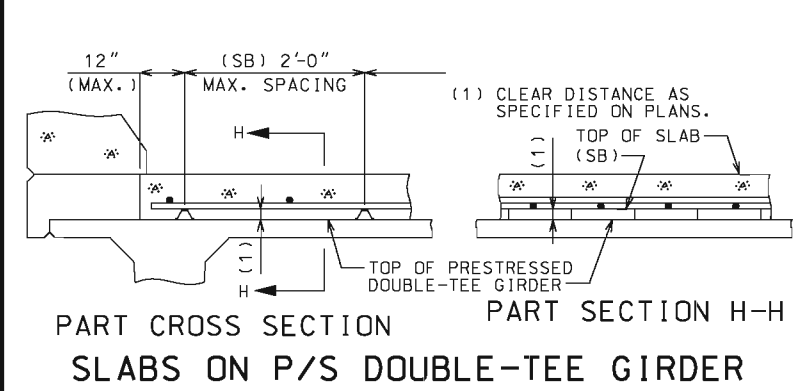
ALL UNCOATED WIRE BAR SUPPORTS SHALL HAVE CAPPED OR DIPPED FEET FOR THOSE APPLICATIONS WHERE MINIMIZING RUST SPOTS AND SURFACE BLEMISHES ARE EXPECTED TO BECOME VISIBLE. COLOR SHALL MATCH CONCRETE.

INDIVIDUAL HIGH CHAIRS AND SPACING WILL BE PERMITTED AS APPROVED BY THE ENGINEER. INDIVIDUAL HIGH CHAIRS SHALL NOT BE PERMITTED FOR USE ON SOLID SLAB AND VOIDED SLAB BRIDGES, EXCEPT AS SHOWN.

PLASTIC BAR SUPPORTS SHALL MEET OR EXCEED THE LOAD CARRYING CAPACITY OF AND BE PLACED AT THE SAME SPACING FOR STEEL WIRE BAR SUPPORTS AS SHOWN.



DECK GIRDERS SUBSTRUCTURE BEAMS VOIDED SLAB DROP PANELS BOX GIRDER CROSS BEAMS TYPICAL - BEAMS & GIRDERS



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
DENNIS W. HECKMAN
NUMBER PE-27141
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

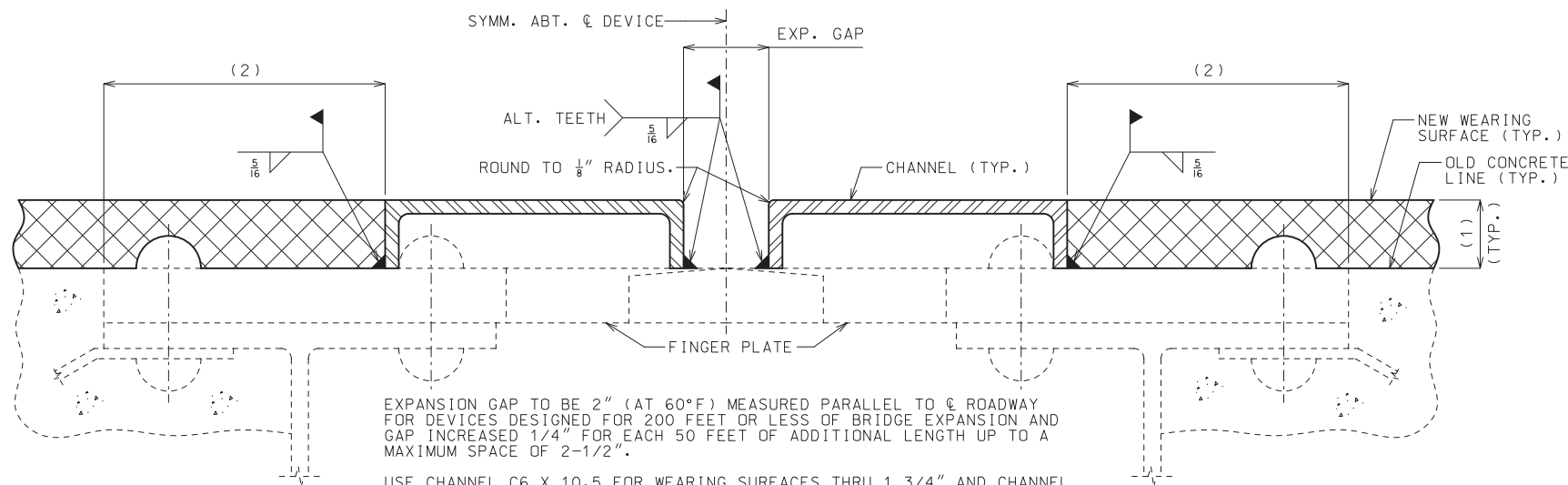
**BAR SUPPORTS
FOR
CONCRETE REINFORCEMENT**

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 9/3/2009

706.35H

SHEET NO.
1 OF 1

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

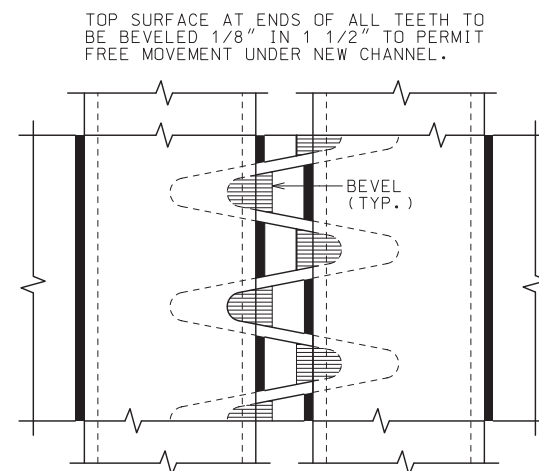


EXPANSION GAP TO BE 2" (AT 60°F) MEASURED PARALLEL TO & ROADWAY FOR DEVICES DESIGNED FOR 200 FEET OR LESS OF BRIDGE EXPANSION AND GAP INCREASED 1/4" FOR EACH 50 FEET OF ADDITIONAL LENGTH UP TO A MAXIMUM SPACE OF 2-1/2".

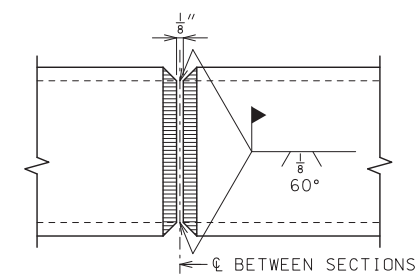
USE CHANNEL C6 X 10.5 FOR WEARING SURFACES THRU 1 3/4" AND CHANNEL C7 X 14.75 OR MC6 X 15.1 FOR WEARING SURFACES GREATER THAN 1 3/4" TO 2 1/4". CUT FLANGES TO MATCH REQUIRED WEARING SURFACE THICKNESS AND NOTCH FLANGE WHERE NECESSARY TO CLEAR RIVET HEADS.

PART SECTION THRU EXPANSION DEVICE

TYPE A - FINGER TYPE EXPANSION DEVICES

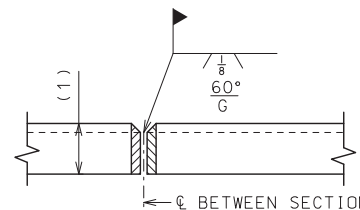


PART PLAN AT EXPANSION DEVICE

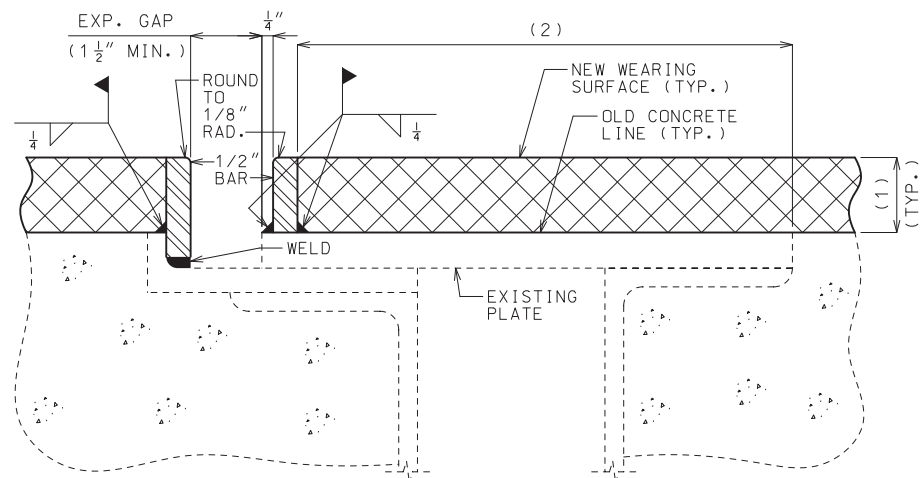


PLAN OF CHANNEL SPLICE

SPLICE TO BE AT & ROADWAY FOR TWO LANE BRIDGES.



ELEVATION OF CHANNEL SPLICE



PART SECTION AT EXPANSION DEVICE

TYPE B - PLATE TYPE EXPANSION DEVICES

- (1) WEARING SURFACE THICKNESS
- (2) WHEN THIS DIMENSION EXCEEDS 3" AND A CONCRETE WEARING SURFACE IS USED, TACK WELD A ONE INCH BAR CHAIR TO THE PLATE OR ANGLE FOR EACH 3" OF PLATE OR ANGLE TO BE COVERED BY WEARING SURFACE.

GENERAL NOTES:

OUTLINE OF OLD WORK IS INDICATED BY LIGHT DASHED LINES. HEAVY LINES INDICATE NEW WORK.

THE EXISTING EXPANSION DEVICE PLATES SHALL BE CHECKED FOR LOOSENESS AND SECURED BEFORE THE NEW BAR DAM IS INSTALLED.

STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH ASTM A70 GRADE 36.

QUALIFICATION OF WELDING OPERATORS WILL BE REQUIRED.

E7016 OR E7018 ELECTRODES SHALL BE USED.

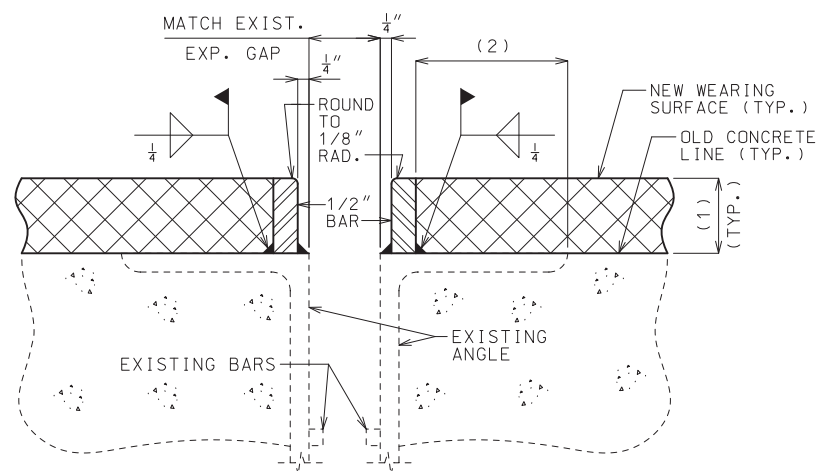
THE STEEL DAMS SHALL EXTEND FULL ROADWAY WIDTH BETWEEN CURBS, BUT SHALL BE INSTALLED IN SECTIONS OF SUCH LENGTHS TO PERMIT AT LEAST ONE WAY TRAFFIC AT ALL TIMES. BEFORE TRAFFIC IS PERMITTED TO CROSS OVER SECTIONS OF DAMS IN PLACE, SUFFICIENT WEARING SURFACE SHALL BE PLACED ON ROADWAY SLAB ADJACENT TO BOTH SIDES OF EXPANSION DEVICE TO PREVENT ANY DAMAGE TO EITHER THE STEEL DAMS OR TIRES OF VEHICLES.

STEEL DAMS SHALL BE FABRICATED AND INSTALLED TO THE CROWN AND GRADE OF THE ROADWAY.

STEEL CHANNELS OR BARS ON BOTH SIDES OF EXPANSION JOINT, FOR FULL WIDTH OF ROADWAY, WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR STEEL BAR DAM.

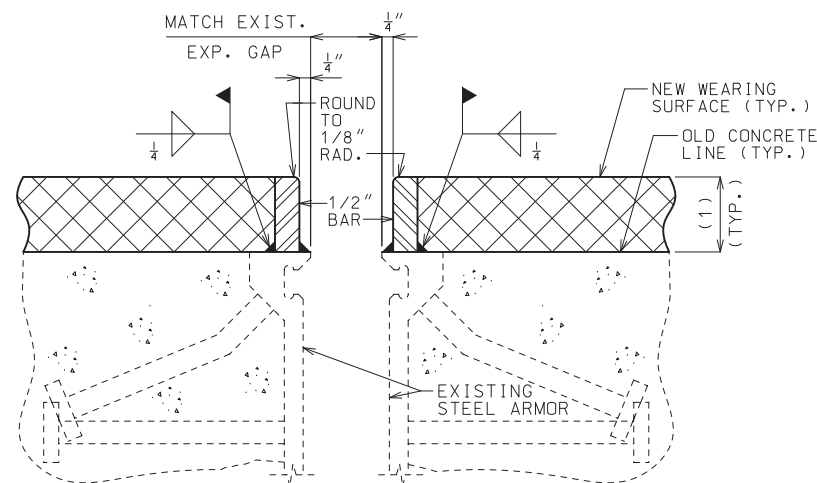
PAINT INSIDE SURFACE OF CHANNEL 5.0 MILS THICKNESS OF INORGANIC ZINC PRIMER.

SHOP DRAWINGS WILL NOT BE REQUIRED FOR STEEL BAR DAMS.



PART SECTION AT EXPANSION DEVICE

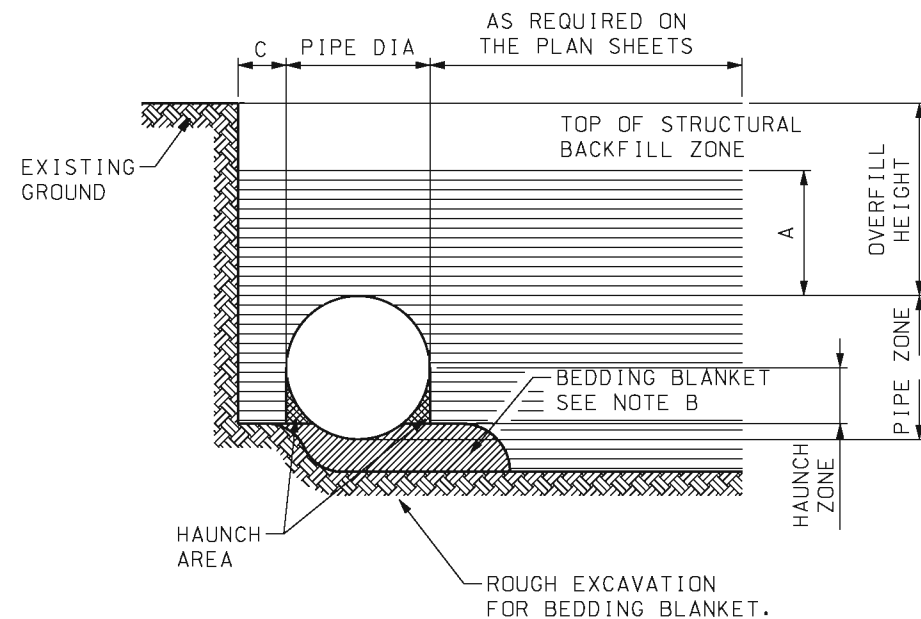
TYPE C - ANGLE TYPE EXPANSION DEVICES



PART SECTION AT EXPANSION DEVICE

TYPE D - STRIP SEAL TYPE EXPANSION DEVICES

| | | | |
|--|----------------|--|--|
| | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| STEEL DAMS | | AT EXPANSION DEVICES FOR RESURFACING BRIDGE FLOORS | |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 712.40L | SHEET NO. 1 OF 1 | |



TYPICAL TRENCH DETAIL PIPE INSTALLATION AND BEDDING

NOTE:

- A) MINIMUM STRUCTURAL BACKFILL OVER TOP OF PIPE SHALL BE ONE-EIGHTH DIAMETER OR SPAN OF PIPE OR ONE FOOT WHICHEVER IS GREATER.
- B) BEDDING BLANKET OF LOOSE FILL SHALL BE ROUGHLY SHAPED TO FIT BOTTOM OF PIPE. MINIMUM THICKNESS BEFORE PLACING PIPE SHALL BE AS FOLLOWS:

| DEPTH OF CORRUGATION | MIN. BEDDING THICKNESS |
|----------------------|------------------------|
| $\frac{1}{2}$ " | 1" |
| 1" | 2" |
| 2" | 3" |

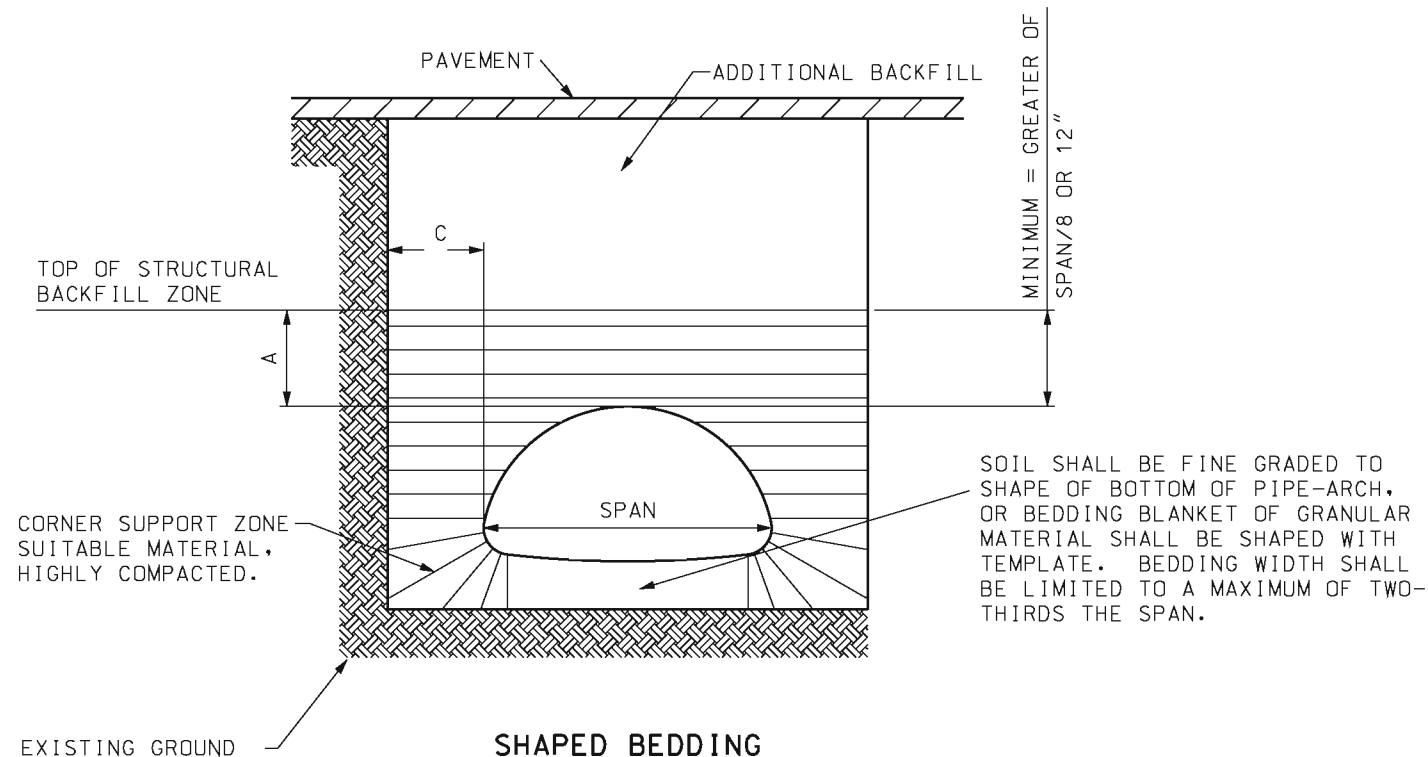
- C) TRENCH INSTALLATIONS - 2 FEET MINIMUM EACH SIDE OF CULVERT. THIS RECOMMENDED LIMIT SHOULD BE MODIFIED AS NECESSARY TO ACCOUNT FOR VARIABLES SUCH AS POOR IN-SITU SOILS. EMBANKMENT INSTALLATIONS - ONE DIAMETER OR SPAN EACH SIDE OF CULVERT.



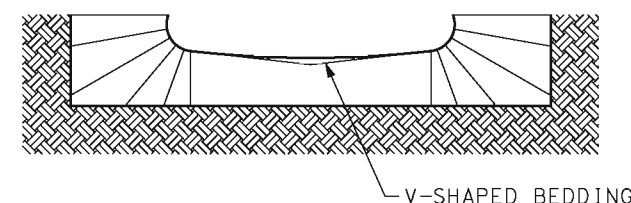
| PIPE | |
|--------------|------------------------|
| DIAMETER | SPACE S |
| UP TO 24" | 12" |
| 24" TO 72" | $\frac{1}{2}$ PIPE DIA |
| 72" AND OVER | 36" |

| PIPE-ARCHES | |
|--------------|-------------------------|
| SPAN | SPACE X |
| UP TO 36" | 12" |
| 36" TO 108" | $\frac{1}{3}$ ARCH SPAN |
| 108" TO 189" | 36" |

MULTIPLE STRUCTURE SPACING



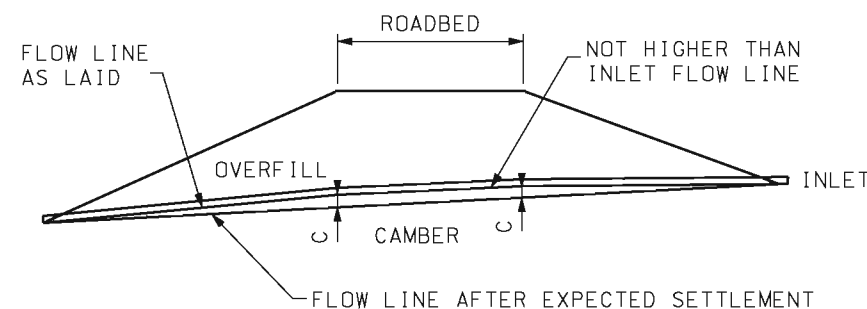
SOIL SHALL BE FINE GRADED TO SHAPE OF BOTTOM OF PIPE-ARCH. OR BEDDING BLANKET OF GRANULAR MATERIAL SHALL BE SHAPED WITH TEMPLATE. BEDDING WIDTH SHALL BE LIMITED TO A MAXIMUM OF TWO-THIRDS THE SPAN.



ALTERNATIVE-SHAPED BEDDING

PIPE-ARCH TRENCH DETAIL


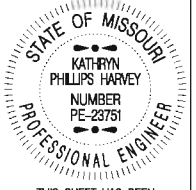
BEDDING AND CORNER ZONE TREATMENT FOR PIPE ARCH STRUCTURES



TYPICAL CAMBERED FLOW LINE

NOTE:

ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITIONS AND WILL BE SPECIFIED ON THE DESIGN PLANS.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | CORRUGATED METAL PIPE INSTALLATION METHODS |
| DATE EFFECTIVE: 04/01/2011 DATE PREPARED: 3/10/2011 | 725.00C |
| SHEET NO. 1 OF 5 | |


| CORRUGATED METAL IC-COATED STEEL CIRCULAR PIPE LOCK SEAM | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------|---------------|---|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|
| MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1) | | | | | | | | | | | | | | | | | | | | | | |
| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER | | SPECIFIED THICKNEWW OF COATED SHEET (IN.) | | | | | | | | | | | | | | | | | | | |
| | CORRUGATED | SPIRAL RIB | 0.064 | | | | 0.079 | | | | 0.109 | | | | 0.138 | | | | 0.168 | | | |
| | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| IN. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. |
| 12 | 1 | 1 | 219 | 251 | 224 | 144 | 273 | 314 | 280 | 201 | 382 | 440 | 392 | 334 | 492 | 566 | 504 | 484 | 602 | 693 | 617 | |
| 15 | 1 | 1 | 175 | 201 | 179 | 115 | 218 | 251 | 224 | 161 | 306 | 352 | 314 | 267 | 394 | 453 | 403 | 387 | 481 | 555 | 493 | |
| 18 | 1 | 1 | 146 | 167 | 149 | 96 | 182 | 209 | 187 | 134 | 255 | 293 | 261 | 223 | 328 | 378 | 336 | 323 | 401 | 462 | 411 | |
| 21 | 1 | 1 | 125 | 143 | 128 | 82 | 156 | 179 | 160 | 115 | 219 | 251 | 224 | 191 | 281 | 324 | 288 | 277 | 344 | 396 | 352 | |
| 24 | 1 | 1 | 109 | 126 | 112 | 72 | 137 | 157 | 140 | 100 | 191 | 220 | 196 | 167 | 246 | 283 | 252 | 242 | 301 | 347 | 308 | |
| 30 | 1 | 1 | 87 | 100 | 90 | 57 | 109 | 126 | 112 | 80 | 153 | 176 | 157 | 134 | 197 | 227 | 202 | 194 | 241 | 277 | 247 | |
| 36 | 1 | 1 | 73 | 84 | 75 | 48 | 91 | 105 | 93 | 67 | 127 | 147 | 131 | 111 | 164 | 189 | 168 | 161 | 201 | 231 | 206 | |
| 42 | 1 | 1 | 62 | 72 | 64 | 41 | 78 | 90 | 80 | 57 | 109 | 126 | 112 | 95 | 141 | 162 | 144 | 138 | 172 | 198 | 176 | |
| 48 | 1 | 1 | 55 | 63 | 56 | 36 | 68 | 78 | 70 | 50 | 96 | 110 | 98 | 83 | 123 | 142 | 126 | 121 | 150 | 173 | 154 | |
| 54 | 1 | 2 | | 56 | 50 | 32* | 61 | 70 | 62 | 45 | 85 | 98 | 87 | 74 | 109 | 126 | 112 | 108 | 134 | 154 | 137 | |
| 60 | 1 | 2 | | 50 | 45 | | | 63 | 56 | 40 | 76 | 88 | 78 | 67 | 98 | 113 | 101 | 97 | 120 | 139 | 123 | |
| 66 | 1 | 2 | | 46 | 41 | | | 57 | 51 | 37* | | 80 | 71 | 61 | 89 | 103 | 92 | 88 | 109 | 126 | 112 | |
| 72 | 1 | 2 | | 42 | 37 | | | 52 | 47 | | | 73 | 65 | 56 | 82 | 94 | 84 | 81 | 100 | 116 | 103 | |
| 78 | 1 | 2 | | 39 | 34 | | | 48 | 43 | | | 68 | 60 | 51 | | 87 | 78 | 75 | 89 | 107 | 95 | |
| 84 | 1 | 2 | | 36 | 32 | | | 45 | 40 | | | 63 | 56 | 48* | | 81 | 72 | 69 | 77 | 99 | 88 | |
| 90 | 1 | 2 | | 33 | 30 | | | 42 | 37 | | | 59 | 52 | | | 76 | 67 | 65 | | 92 | 82 | |
| 96 | 1 | 2 | | | | | | 39 | 35 | | | 55 | 49 | | | 71 | 63 | 60* | | 87 | 77 | |
| 102 | 2 | 3 | | | | | | 37 | 33 | | | 52 | 46 | | | 67 | 59 | 53* | | 82 | 73 | |
| 108 | 2 | 3 | | | | | | | | | | 49 | 44 | | | 63 | 56 | | | 77 | 69 | |
| 114 | 2 | 3 | | | | | | | | | | 46 | 41 | | | 60 | 53 | | | 73 | 65 | |
| 120 | 2 | 3 | | | | | | | | | | 44 | 39 | | | 57 | 50 | | | 69 | 62 | |
| 126 | 2 | 3 | | | | | | | | | | | | | | 54 | 48 | | | 66 | 59 | |

| CORRUGATED METAL IC-COATED STEEL CIRCULAR PIPE RIVETED SEAM | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------|---------------|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1) | | | | | | | | | | | | | | | | | | | | | | |
| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER | | SPECIFIED THICKNEWW OF COATED SHEET (IN.) | | | | | | | | | | | | | | | | | | | |
| | CORRUGATED | SPIRAL RIB | 0.064 | | | | 0.079 | | | | 0.109 | | | | 0.138 | | | | 0.168 | | | |
| | | | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET | SINGLE RIVET | DOUBLE RIVET |
| IN. | FT. | FT. | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| 12 | 1 | 1 | 143 | | 185 | 245 | 156 | | 255 | 305 | 200 | | 382 | 440 | 209 | | 419 | 544 | 219 | | 438 | 604 |
| 15 | 1 | 1 | 114 | | 148 | 196 | 124 | | 204 | 244 | 160 | | 306 | 352 | 168 | | 335 | 436 | 175 | | 351 | 483 |
| 18 | 1 | 1 | 95 | | 123 | 164 | 104 | | 170 | 203 | 133 | | 255 | 293 | 140 | | 279 | 363 | 146 | | 292 | 403 |
| 21 | 1 | 1 | 82 | | 105 | 140 | 89 | | 146 | 174 | 114 | | 219 | 251 | 120 | | 239 | 311 | 125 | | 251 | 345 |
| 24 | 1 | 1 | 71 | | 92 | 123 | 78 | | 127 | 153 | 100 | | 191 | 220 | 105 | | 209 | 272 | 109 | | 219 | 302 |
| 30 | 1 | 1 | 57 | | 74 | 98 | 62 | | 102 | 122 | 80 | | 153 | 176 | 84 | | 168 | 218 | 88 | | 175 | 242 |
| 36 | 1 | 1 | 48 | | 62 | 82 | 52 | | 85 | 102 | 67 | | 127 | 147 | 70 | | 140 | 181 | 73 | | 146 | 201 |
| 42 | 1 | 1 | 41 | | 53 | 70 | 44 | | 73 | 87 | 57 | | 109 | 126 | 60 | | 120 | 156 | 63 | | 125 | 173 |
| 48 | 1 | 1 | 36 | | 46 | 61 | 39 | | 64 | 76 | 50 | | 96 | 110 | 52 | | 105 | 136 | 55 | | 110 | 151 |
| 54 | 1 | 2 | | | | 55 | 35 | | 57 | 68 | 44 | | 85 | 98 | 47 | | 93 | 121 | 49 | | 97 | 134 |
| 60 | 1 | 2 | | | | 49 | | | | 61 | 40 | | 76 | 88 | 42 | | 84 | 109 | 44 | | 88 | 121 |
| 66 | 1 | 2 | | | | 45 | | | | 55 | | | 80 | 94 | 38 | | 76 | 99 | 40 | | 80 | 110 |
| 72 | 1 | 2 | | | | 41 | | | | 51 | | | 73 | 87 | 35 | | 70 | 91 | 36 | | 73 | 101 |
| 78 | 1 | 2 | | | | 38 | | | | 47 | | | 68 | 82 | | | 84 | 109 | 34 | | 67 | 93 |
| 84 | 1 | 2 | | | | 35 | | | | 44 | | | 63 | 77 | | | 78 | 104 | 31 | | 63 | 86 |
| 90 | 1 | 2 | | | | 33 | | | | 41 | | | 59 | 73 | | | 73 | 97 | | | | 81 |
| 96 | 1 | 2 | | | | | | | | 38 | | | 55 | 69 | | | 68 | 94 | | | | 76 |
| 102 | 2 | 3 | | | | | | | | 36 | | | 52 | 66 | | | 64 | 90 | | | | 71 |
| 108 | 2 | 3 | | | | | | | | | | | 49 | 63 | | | 60 | 86 | | | | 67 |
| 114 | 2 | 3 | | | | | | | | | | | 46 | 60 | | | 57 | 83 | | | | 64 |
| 120 | 2 | 3 | | | | | | | | | | | 44 | 58 | | | 54 | 80 | | | | 60 |
| 126 | 2 | 3 | | | | | | | | | | | | 56 | | | 52 | 78 | | | | 58 |

* FOR TRENCH INSTALLATION ONLY

A = 2-2/3" X 1/2" CORRUGATIONS.
B = 3" X 1" CORRUGATIONS.
C = 5" X 1" CORRAGATIONS
D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN
PHILLIPS HARVEY
NUMBER
PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED SEALED AND DATED
ELECTRONICALLY.

CORRUGATED METAL PIPE
INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 3/9/2011

725.00C

SHEET NO.
2 OF 5

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.


| CORRUGATED H32 ALUMINUM CIRCULAR PIPE LOCK SEAM | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------|---------------|---|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|
| MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1) | | | | | | | | | | | | | | | | | | | | | | |
| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER | | SPECIFIED THICKNEWW OF COATED SHEET (IN.) | | | | | | | | | | | | | | | | | | | |
| | CORRUGATED | SPIRAL RIB | 0.06 | | | | 0.075 | | | | 0.105 | | | | 0.135 | | | | 0.164 | | | |
| | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| IN. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. |
| 12 | 1 | 1 | 132 | 152 | | 71 | 165 | 191 | | 97 | 232 | 267 | | 156 | 298 | 357 | | 221 | 364 | 420 | | |
| 15 | 1 | 1 | 106 | 122 | | 57 | 132 | 153 | | 78 | 185 | 213 | | 125 | 239 | 286 | | 176 | 291 | 336 | | |
| 18 | 1 | 1 | 88 | 101 | | 47 | 110 | 127 | | 65 | 155 | 178 | | 104 | 199 | 238 | | 147 | 243 | 280 | | |
| 21 | 1 | 1 | 76 | 87 | | 41 | 95 | 109 | | 56 | 132 | 152 | | 89 | 170 | 204 | | 126 | 208 | 240 | | |
| 24 | 1 | 1 | 66 | 76 | | 35 | 83 | 96 | | 49 | 116 | 133 | | 78 | 149 | 178 | | 110 | 182 | 210 | | |
| 30 | 1 | 2 | | 61 | | 28 | 66 | 76 | | 39 | 93 | 107 | | 62 | 119 | 143 | | 88 | 146 | 168 | | |
| 36 | 1 | 2 | | 51 | | 24* | 55 | 64 | | 32 | 77 | 89 | | 52 | 99 | 119 | | 74 | 121 | 140 | | |
| 42 | 1 | 2 | | 43 | | | | 55 | | 28* | 66 | 76 | | 45 | 85 | 102 | | 63 | 104 | 120 | | |
| 48 | 1 | 2 | | 38 | | | | 48 | | | 58 | 67 | | 39 | 75 | 89 | | 55 | 91 | 105 | | |
| 54 | 1 | 2 | | 34 | | | | 42 | | | 51 | 59 | | 35 | 66 | 79 | | 49 | 81 | 93 | | |
| 60 | 1 | 2 | | 30 | | | | 38 | | | | 53 | | 31* | 55 | 71 | | 44 | 68 | 84 | | |
| 66 | 1 | 2 | | 28 | | | | 35 | | | | 48 | | | | 65 | | 40 | 56 | 76 | | |
| 72 | 1 | 3 | | 25 | | | | 32 | | | | 44 | | | | 59 | | 37* | 46 | 70 | | |
| 78 | 1 | 3 | | | | | | 29 | | | | 41 | | | | 55 | | | | 65 | | |
| 84 | 1 | 3 | | | | | | | | | | 38 | | | | 51 | | | | 60 | | |
| 90 | 1 | 3 | | | | | | | | | | 36 | | | | 48 | | | | 56 | | |
| 96 | 1 | 3 | | | | | | | | | | 33 | | | | 45 | | | | 53 | | |
| 102 | 2 | 4 | | | | | | | | | | | | | | 42 | | | | 49 | | |
| 108 | 2 | 4 | | | | | | | | | | | | | | 39 | | | | 47 | | |
| 114 | 2 | 4 | | | | | | | | | | | | | | | | | | 42 | | |
| 120 | 2 | 4 | | | | | | | | | | | | | | | | | | 39 | | |
| 126 | 2 | 4 | | | | | | | | | | | | | | | | | | | | |

| CORRUGATED H32 ALUMINUM CIRCULAR PIPE RIVETED SEAM | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------|---------------|---|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|
| MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1) | | | | | | | | | | | | | | | | | | | | | | |
| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER | | SPECIFIED THICKNEWW OF COATED SHEET (IN.) | | | | | | | | | | | | | | | | | | | |
| | CORRUGATED | SPIRAL RIB | 0.06 | | | | 0.075 | | | | 0.105 | | | | 0.135 | | | | 0.164 | | | |
| | | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | |
| IN. | FT. | FT. | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. |
| 12 | 1 | 1 | 77 | | 120 | 141 | 77 | | 154 | 175 | 133 | | 269 | 239 | 138 | | 282 | 359 | 144 | | 291 | 466 |
| 15 | 1 | 1 | 62 | | 96 | 113 | 62 | | 123 | 140 | 107 | | 215 | 191 | 111 | | 226 | 287 | 115 | | 232 | 373 |
| 18 | 1 | 1 | 51 | | 80 | 94 | 51 | | 103 | 117 | 89 | | 179 | 160 | 92 | | 188 | 239 | 96 | | 194 | 311 |
| 21 | 1 | 1 | 44 | | 68 | 81 | 44 | | 88 | 100 | 76 | | 154 | 137 | 79 | | 161 | 205 | 82 | | 166 | 266 |
| 24 | 1 | 1 | 38 | | 60 | 71 | 38 | | 77 | 88 | 67 | | 135 | 120 | 69 | | 141 | 179 | 72 | | 145 | 233 |
| 30 | 1 | 2 | | | | 56 | 31 | | 62 | 70 | 53 | | 108 | 96 | 55 | | 113 | 144 | 57 | | 116 | 186 |
| 36 | 1 | 2 | | | | 47 | 26 | | 51 | 58 | 44 | | 90 | 80 | 46 | | 94 | 120 | 48 | | 97 | 155 |
| 42 | 1 | 2 | | | | 40 | | | | 50 | 38 | | 77 | 68 | 40 | | 81 | 103 | 41 | | 83 | 133 |
| 48 | 1 | 2 | | | | 35 | | | | 44 | 33 | | 67 | 60 | 35 | | 71 | 90 | 36 | | 73 | 116 |
| 54 | 1 | 2 | | | | 31 | | | | 39 | 30 | | 56 | 53 | 31 | | 63 | 80 | 32 | | 65 | 104 |
| 60 | 1 | 2 | | | | 28 | | | | 35 | | | | 48 | 28 | | 56 | 72 | 29 | | 58 | 93 |
| 66 | 1 | 2 | | | | 26 | | | | 32 | | | | 44 | | | | 65 | 26 | | 53 | 85 |
| 72 | 1 | 3 | | | | 24 | | | | 29 | | | | 40 | | | | 60 | 24 | | 47 | 78 |
| 78 | 1 | 3 | | | | | | | | 27 | | | | 37 | | | | 55 | | | | 72 |
| 84 | 1 | 3 | | | | | | | | | | | | 34 | | | | 51 | | | | 67 |
| 90 | 1 | 3 | | | | | | | | | | | | 32 | | | | 48 | | | | 62 |
| 96 | 1 | 3 | | | | | | | | | | | | 30 | | | | 45 | | | | 58 |
| 102 | 2 | 4 | | | | | | | | | | | | | | | | 42 | | | | 55 |
| 108 | 2 | 4 | | | | | | | | | | | | | | | | 40 | | | | 51 |
| 114 | 2 | 4 | | | | | | | | | | | | | | | | | | | | 46 |
| 120 | 2 | 4 | | | | | | | | | | | | | | | | | | | | 41 |
| 126 | 2 | 4 | | | | | | | | | | | | | | | | | | | | |

* FOR TRENCH INSTALLATION ONLY

A = 2-2/3" X 1/2" CORRUGATIONS.
B = 3" X 1" CORRUGATIONS.
C = 5" X 1" CORRAGATIONS
D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF
PIPE TO SURFACE.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
KATHRYN
PHILLIPS HARVEY
NUMBER
PE-23751
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

CORRUGATED METAL PIPE
INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 3/9/2011

725.00C

SHEET NO.
3 OF 5

IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.


| CORRUGATED H34 ALUMINUM CIRCULAR PIPE LOCK SEAM | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------|---------------|---|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|
| MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1) | | | | | | | | | | | | | | | | | | | | | | |
| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER | | SPECIFIED THICKNESS OF COATED SHEET (IN.) | | | | | | | | | | | | | | | | | | | |
| | CORRUGATED | SPIRAL RIB | 0.06 | | | | 0.075 | | | | 0.105 | | | | 0.135 | | | | 0.164 | | | |
| | | | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| IN. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. |
| 12 | 1 | 1 | 159 | 183 | | 85 | 199 | 229 | | 117 | 278 | 320 | | 187 | 358 | 428 | | 265 | 437 | 504 | | |
| 15 | 1 | 1 | 127 | 146 | | 68 | 159 | 183 | | 93 | 223 | 256 | | 150 | 286 | 343 | | 212 | 350 | 403 | | |
| 18 | 1 | 1 | 106 | 122 | | 57 | 132 | 153 | | 78 | 185 | 213 | | 125 | 239 | 286 | | 176 | 291 | 336 | | |
| 21 | 1 | 1 | 91 | 104 | | 49 | 113 | 131 | | 67 | 159 | 183 | | 107 | 205 | 245 | | 151 | 250 | 288 | | |
| 24 | 1 | 1 | 79 | 91 | | 43 | 99 | 115 | | 58 | 139 | 160 | | 94 | 179 | 214 | | 132 | 218 | 252 | | |
| 30 | 1 | 2 | | 73 | | 34 | 79 | 92 | | 47 | 111 | 128 | | 75 | 143 | 171 | | 106 | 175 | 202 | | |
| 36 | 1 | 2 | | 61 | | 28* | 66 | 76 | | 39 | 93 | 107 | | 62 | 119 | 143 | | 88 | 146 | 168 | | |
| 42 | 1 | 2 | | 52 | | | | 66 | | 33* | 79 | 91 | | 54 | 102 | 122 | | 76 | 125 | 144 | | |
| 48 | 1 | 2 | | 46 | | | | 57 | | | 68 | 80 | | 47 | 89 | 107 | | 66 | 109 | 126 | | |
| 54 | 1 | 2 | | 41 | | | | 51 | | | 56 | 71 | | 42 | 73 | 95 | | 59 | 90 | 112 | | |
| 60 | 1 | 2 | | 37 | | | | 46 | | | | 64 | | 37* | 59 | 86 | | 53 | 73 | 101 | | |
| 66 | 1 | 2 | | 33 | | | | 42 | | | | 58 | | | | 78 | | 48 | 59 | 92 | | |
| 72 | 1 | 3 | | 30 | | | | 38 | | | | 53 | | | | 71 | | 42* | 47 | 84 | | |
| 78 | 1 | 3 | | | | | | 35 | | | | 49 | | | | 66 | | | | 78 | | |
| 84 | 1 | 3 | | | | | | | | | | 46 | | | | 61 | | | | 72 | | |
| 90 | 1 | 3 | | | | | | | | | | 43 | | | | 57 | | | | 67 | | |
| 96 | 1 | 3 | | | | | | | | | | 39 | | | | 53 | | | | 62 | | |
| 102 | 2 | 4 | | | | | | | | | | | | | | 48 | | | | 56 | | |
| 108 | 2 | 4 | | | | | | | | | | | | | | 43 | | | | 51 | | |
| 114 | 2 | 4 | | | | | | | | | | | | | | | | | | 46 | | |
| 120 | 2 | 4 | | | | | | | | | | | | | | | | | | 41 | | |
| 126 | 2 | 4 | | | | | | | | | | | | | | | | | | | | |

| CORRUGATED H34 ALUMINUM CIRCULAR PIPE RIVETED SEAM | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------|---------------|---|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|--------------|-----|
| MAXIMUM ALLOWABLE OVERFILL HEIGHTS (1) | | | | | | | | | | | | | | | | | | | | | | |
| SPECIFIED DIAMETER OF PIPE | MINIMUM COVER | | SPECIFIED THICKNESS OF COATED SHEET (IN.) | | | | | | | | | | | | | | | | | | | |
| | CORRUGATED | SPIRAL RIB | 0.06 | | | | 0.075 | | | | 0.105 | | | | 0.135 | | | | 0.164 | | | |
| | | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | | SINGLE RIVET | | DOUBLE RIVET | |
| IN. | FT. | FT. | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. | FT. |
| 12 | 1 | 1 | 77 | | 120 | 141 | 77 | | 154 | 175 | 133 | | 269 | 239 | 138 | | 282 | 359 | 144 | | 291 | 466 |
| 15 | 1 | 1 | 62 | | 96 | 113 | 62 | | 123 | 140 | 107 | | 215 | 191 | 111 | | 226 | 287 | 115 | | 232 | 373 |
| 18 | 1 | 1 | 51 | | 80 | 94 | 51 | | 103 | 117 | 89 | | 179 | 160 | 92 | | 188 | 239 | 96 | | 194 | 311 |
| 21 | 1 | 1 | 44 | | 68 | 81 | 44 | | 88 | 100 | 76 | | 154 | 137 | 79 | | 161 | 205 | 82 | | 166 | 266 |
| 24 | 1 | 1 | 38 | | 60 | 71 | 38 | | 77 | 88 | 67 | | 135 | 120 | 69 | | 141 | 179 | 72 | | 145 | 233 |
| 30 | 1 | 2 | | | | 56 | 31 | | 62 | 70 | 53 | | 108 | 96 | 55 | | 113 | 144 | 57 | | 116 | 186 |
| 36 | 1 | 2 | | | | 47 | 26 | | 51 | 58 | 44 | | 90 | 80 | 46 | | 94 | 120 | 48 | | 97 | 155 |
| 42 | 1 | 2 | | | | 40 | | | | 50 | 38 | | 77 | 68 | 40 | | 81 | 103 | 41 | | 83 | 133 |
| 48 | 1 | 2 | | | | 35 | | | | 44 | 33 | | 67 | 60 | 35 | | 71 | 90 | 36 | | 73 | 116 |
| 54 | 1 | 2 | | | | 31 | | | | 39 | 30 | | 56 | 53 | 31 | | 63 | 80 | 32 | | 65 | 104 |
| 60 | 1 | 2 | | | | 28 | | | | 35 | | | | 48 | 28 | | 56 | 72 | 29 | | 58 | 93 |
| 66 | 1 | 2 | | | | 26 | | | | 32 | | | | 44 | | | | 65 | 26 | | 53 | 85 |
| 72 | 1 | 3 | | | | 24 | | | | 29 | | | | 40 | | | | 60 | 24 | | 47 | 78 |
| 78 | 1 | 3 | | | | | | | | 27 | | | | 37 | | | | 55 | | | | 72 |
| 84 | 1 | 3 | | | | | | | | | | | | 34 | | | | 51 | | | | 67 |
| 90 | 1 | 3 | | | | | | | | | | | | 32 | | | | 48 | | | | 62 |
| 96 | 1 | 3 | | | | | | | | | | | | 30 | | | | 45 | | | | 58 |
| 102 | 2 | 4 | | | | | | | | | | | | | | | | 42 | | | | 55 |
| 108 | 2 | 4 | | | | | | | | | | | | | | | | 40 | | | | 51 |
| 114 | 2 | 4 | | | | | | | | | | | | | | | | | | | | 46 |
| 120 | 2 | 4 | | | | | | | | | | | | | | | | | | | | 41 |
| 126 | 2 | 4 | | | | | | | | | | | | | | | | | | | | |

* FOR TRENCH INSTALLATION ONLY


A = 2-2/3" X 1/2" CORRUGATIONS.
B = 3" X 1" CORRUGATIONS.
C = 5" X 1" CORRAGATIONS
D = 3/4" X 3/4" X 7-1/2" SPIRAL RIB

(1) MAXIMUM OVERFILL MEASURED FROM THE TOP OF PIPE TO SURFACE.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



**CORRUGATED METAL PIPE
INSTALLATION METHODS**

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 4/1/2013

725.00C

SHEET NO.
4 OF 5

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.


| MINIMUM COVER FOR CONSTRUCTION LOADS (ROUND AND PIPE-ARCH) | | | | |
|---|---|-----------------------|------------------------|-------------------------|
| DIAMETER OR PIPE SPAN | MINIMUM COVER (FT.) FOR INDICATED AXLE LOADS (2) | | | |
| | 18K LBS.- 50K LBS. | 50K LBS.- 75K LBS. | 75K LBS.- 110K LBS. | 110K LBS.- 150K LBS. |
| IN. | FT. | FT. | FT. | FT. |
| 12-42 | 2.0 | 2.5 | 3.0 | 3.0 |
| 48-72 | 3.0 | 3.0 | 3.5 | 4.0 |
| 78-120 | 3.0 | 3.5 | 4.0 | 4.0 |
| 126-144 | 3.5 | 4.0 | 4.5 | 4.5 |

THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.

| PIPE-ARCH REQUIREMENTS 2-2/3" X 1/2" CORRUGATIONS | | | | |
|--|-------------|-------------|--------------------|-------|
| TYPE | SPAN (3) | RISE (3) | GALVANIZED SHEET | |
| | (IN.) | (IN.) | THICKNESS (IN.) | GAUGE |
| B1 | 17 | 13 | 0.064 | 16 |
| B2 | 21 | 15 | 0.064 | 16 |
| B3 | 24 | 18 | 0.064 | 16 |
| B4 | 28 | 20 | 0.064 | 16 |
| B5 | 35 | 24 | 0.064 | 16 |
| B6 | 42 | 29 | 0.079 | 14 |
| B7 | 49 | 33 | 0.109 | 12 |
| B8 | 57 | 38 | 0.109 | 12 |
| B9 | 64 | 43 | 0.109 | 12 |
| B10 | 71 | 47 | 0.138 | 10 |
| B11 | 77 | 52 | 0.168 | 8 |
| B12 | 83 | 57 | 0.168 | 8 |

| PIPE-ARCH REQUIREMENTS | | | | | | | |
|------------------------|-------------|-------------|---|-------|---|-------|----------------------|
| TYPE | SPAN (4) | RISE (4) | GALVANIZED SHEET 3" X 1" CORRUGATIONS | | GALVANIZED SHEET 5" X 1" CORRUGATIONS | | MINIMUM COVER (2) |
| | (IN.) | (IN.) | THICKNESS (IN.) | GAUGE | THICKNESS (IN.) | GAUGE | (IN.) |
| B8A | 53 (-2.4) | 41 (+2.4) | 0.079 | 14 | 0.109 | 12 | 12 |
| B9A | 60 (-2.7) | 46 (+2.7) | 0.079 | 14 | 0.109 | 12 | 15 |
| B10A | 66 (-3.0) | 51 (+3.0) | 0.079 | 14 | 0.109 | 12 | 15 |
| B11A | 73 (-3.3) | 55 (+3.3) | 0.079 | 14 | 0.109 | 12 | 18 |
| B12A | 81 (-3.6) | 59 (+3.6) | 0.079 | 14 | 0.109 | 12 | 18 |
| B13A | 87 (-4.4) | 63 (+4.4) | 0.079 | 14 | 0.109 | 12 | 18 |
| B14A | 95 (-4.8) | 67 (+4.8) | 0.079 | 14 | 0.109 | 12 | 18 |
| B15A | 103 (-5.2) | 71 (+5.2) | 0.079 | 14 | 0.109 | 12 | 18 |
| B16A | 112 (-5.6) | 75 (+5.6) | 0.109 | 12 | 0.109 | 12 | 21 |
| B17A | 117 (-5.9) | 79 (+5.9) | 0.109 | 12 | 0.109 | 12 | 21 |
| B18A | 128 (-6.4) | 83 (+6.4) | 0.109 | 12 | 0.109 | 12 | 24 |
| B19A | 137 (-6.9) | 87 (+6.9) | 0.109 | 12 | 0.109 | 12 | 24 |
| B20A | 142 (-7.1) | 91 (+7.1) | 0.138 | 10 | 0.138 | 10 | 24 |

- (2) MINIMUM COVER MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.
- (3) A TOLERANCE OF PLUS OR MINUS ONE INCH OR 2 PERCENT OF EQUIVALENT CIRCULAR DIAMETER, WHICHEVER IS GREATER, WILL BE PERMISSIBLE IN SPAN AND RISE.
- (4) TOLERANCES IN PARENTHESES. NO TOLERANCE IN OPPOSITE DIRECTION.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E.
SCHROETER

NUMBER
PE-28411

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

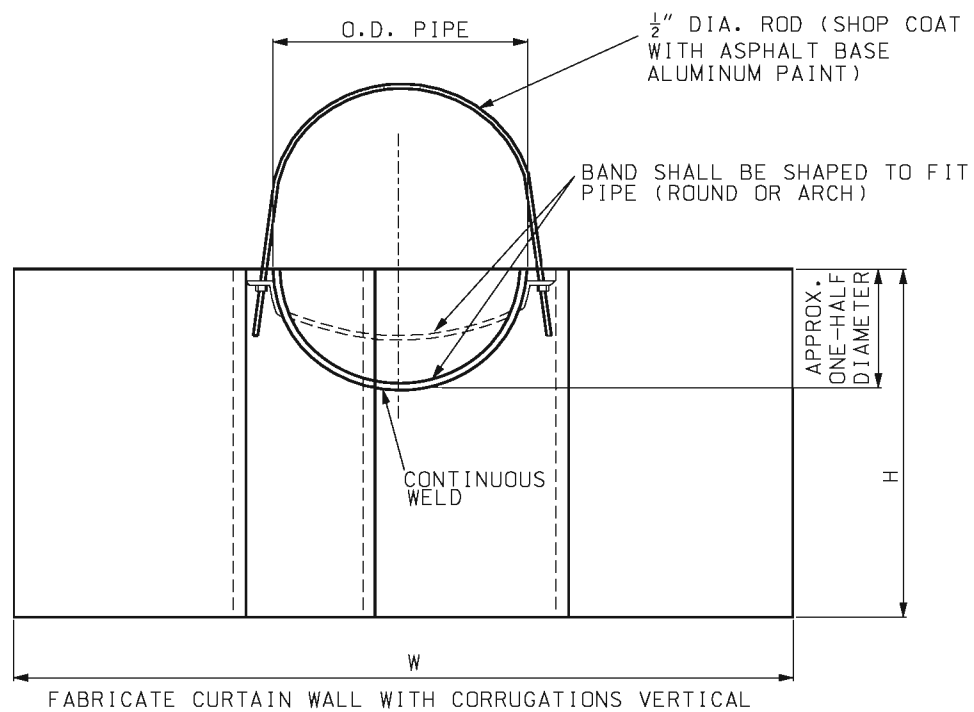
CORRUGATED METAL PIPE
INSTALLATION METHODS

DATE EFFECTIVE: 04/01/2011
DATE PREPARED: 8/24/2015

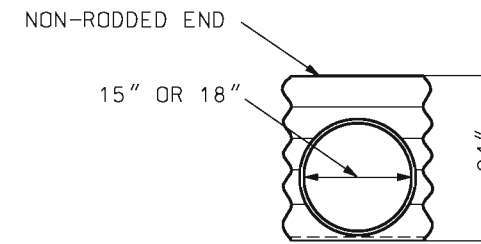
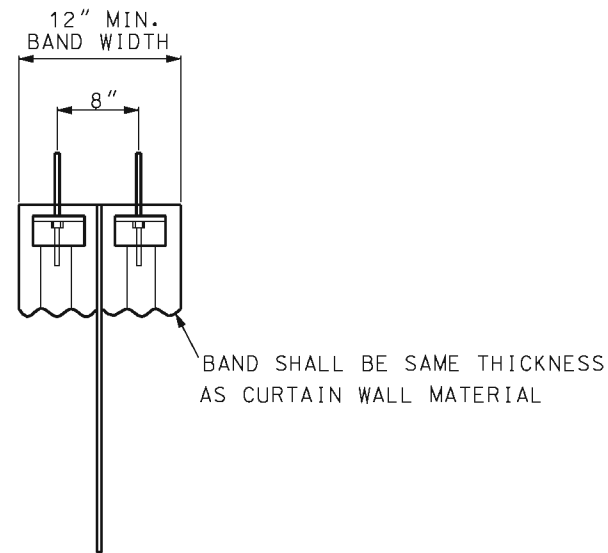
725.00C

SHEET NO.
5 OF 5

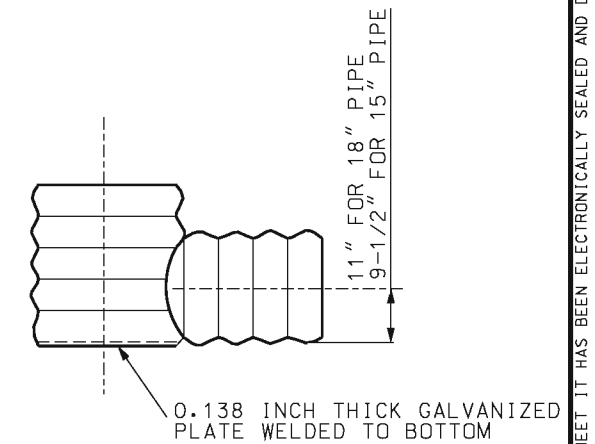
IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



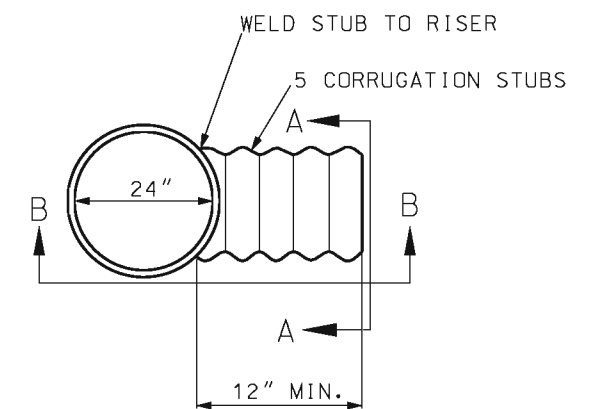
METAL CURTAIN WALL



SECTION A-A



SECTION B-B



PLAN
METAL INLETS

TABLE FOR METAL
CURTAIN WALL

FOR ROUND OR ELLIPTICAL PIPE

| DIA. IN. | GALV. SHT. THICK IN. | W IN. | H IN. |
|-------------|-------------------------|----------|----------|
| 18 | 0.064 | 72 | 35 |
| 21 | 0.064 | 72 | 35 |
| 24 | 0.064 | 72 | 40 |
| 30 | 0.064 | 84 | 40 |
| 36 | 0.079 | 84 | 49 |
| 42 | 0.079 | 96 | 49 |
| 48 | 0.079 | 96 | 49 |
| 54 | 0.079 | 120 | 58-1/2 |
| 60 | 0.109 | 120 | 58-1/2 |
| 66 | 0.109 | 132 | 58-1/2 |
| 72 | 0.109 | 132 | 68-1/2 |
| 78 | 0.138 | 132 | 68-1/2 |
| 84 | 0.138 | 144 | 68-1/2 |

FOR PIPE ARCH

| | | | |
|------|-------|-----|----|
| B-2 | 0.064 | 72 | 30 |
| B-3 | 0.064 | 72 | 30 |
| B-4 | 0.079 | 84 | 30 |
| B-5 | 0.079 | 84 | 30 |
| B-6 | 0.109 | 96 | 35 |
| B-7 | 0.109 | 96 | 35 |
| B-8 | 0.109 | 108 | 35 |
| B-9 | 0.109 | 120 | 35 |
| B-10 | 0.138 | 120 | 40 |
| B-11 | 0.168 | 125 | 50 |
| B-12 | 0.168 | 131 | 54 |

GENERAL NOTES:



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

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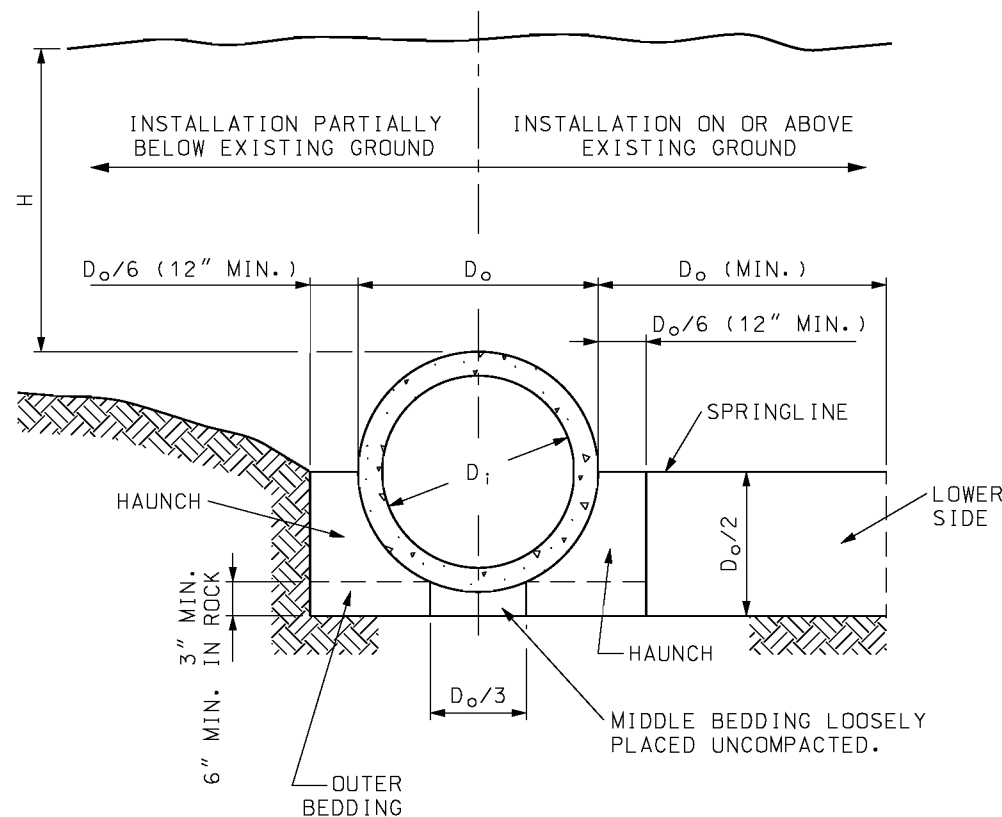
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
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METAL CURTAIN WALL
AND METAL INLETS

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 8/21/2009

725.31C

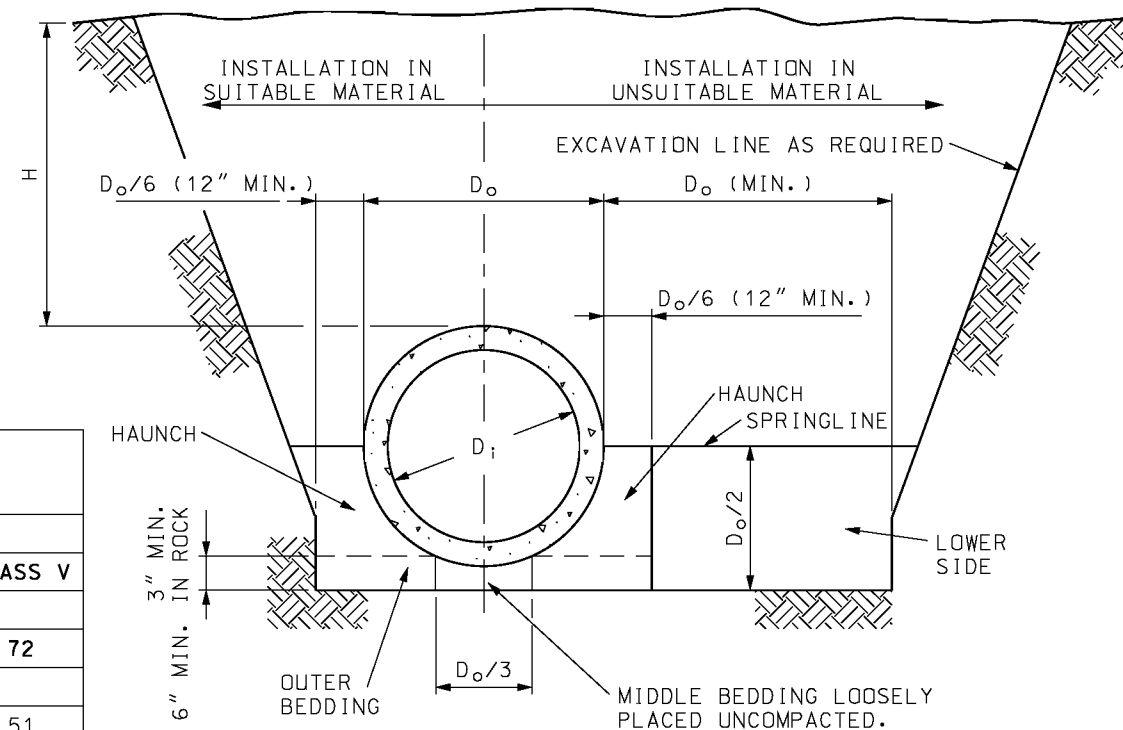
SHEET NO.
1 OF 1



EMBANKMENT INSTALLATIONS

- CONSTRUCTION SEQUENCE
1. PLACE BEDDING MATERIAL TO GRADE. DO NOT COMPACT.
 2. INSTALL PIPE TO GRADE.
 3. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
 4. PLACE AND COMPACT THE HAUNCH AREA UP TO THE SPRINGLINE.
 5. COMPLETE BACKFILL ACCORDING TO SPECIFICATIONS.

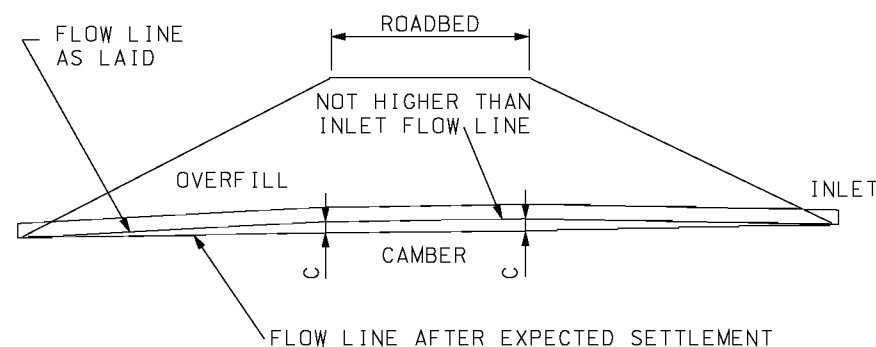
| MAXIMUM DIAMETER AND MAXIMUM FILL HEIGHT | | | | | |
|--|--|----------|-----------|----------|---------|
| INSTALLATION TYPE | CLASS OF PIPE | | | | |
| | CLASS I | CLASS II | CLASS III | CLASS IV | CLASS V |
| | MAXIMUM DIAMETER (INCHES) | | | | |
| | 108 | 108 | 108 | 84 | 72 |
| TYPE 1 | MAXIMUM FILL HEIGHT IN (FEET) | | | | |
| | 12 | 15 | 21 | 33 | 51 |
| | 9 | 12 | 17 | 26 | 39 |
| | 7 | 9 | 13 | 20 | 30 |
| TYPE 4 | 4 | 6 | 9 | 13 | 20 |
| | IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS 36 INCHES OR LESS A SPECIAL PIPE DESIGN AND INSTALLATION PROCEDURE SHALL BE REQUIRED. IF FILL HEIGHT EXCEEDS 51 FEET AND PIPE DIAMETER IS GREATER THAN 36 INCHES A SPECIAL DESIGN PIPE IS NOT ALLOWED. | | | | |



TRENCH INSTALLATION

- LEGEND -

D_i = NORMAL INSIDE DIAMETER OF PIPE.
 D_o = OUTSIDE DIAMETER OF PIPE.
 H = FILL COVER HEIGHT OVER PIPE (FEET)
MIN. = MINIMUM
 = UNDISTURBED SOIL



NOTE:
ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND SHALL BE SPECIFIED ON THE DESIGN PLANS.

TYPICAL CAMBERED FLOW LINE

| BEDDING AND COMPACTION REQUIREMENTS | | | | | | | |
|-------------------------------------|---|---|------------------------|---------------------|------------------------|------------------------|---------------------|
| INSTALLATION TYPE | BEDDING THICKNESS | COMPACTION REQUIREMENTS (MIN. STANDARD PROCTOR %) | | | | | |
| | | HAUNCH AND OUTER BEDDING | | | LOWER SIDE BEDDING | | |
| | | CATEGORY 1 SOIL (A) | CATEGORY 2 SOIL (B) | CATEGORY 3 SOIL (C) | CATEGORY 1 SOIL (A) | CATEGORY 2 SOIL (B) | CATEGORY 3 SOIL (C) |
| 1 | $D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6". | 95 | N/A | N/A | 90 | 95 | 100 |
| 2 | $D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6". | 90 | 95 | N/A | 85 | 90 | 95 |
| 3 | $D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6". | 85 | 90 | 95 | 85 | 90 | 95 |
| 4 | $D_o/24$ MINIMUM, NOT LESS THAN 3". IF ROCK FOUNDATION, USE $D_o/12$ MINIMUM, NOT LESS THAN 6". | NO COMPACTION REQUIRED | NO COMPACTION REQUIRED | 85 | NO COMPACTION REQUIRED | NO COMPACTION REQUIRED | 85 |

(A) GRAVELLY SAND
(B) SANDY-SILT
(C) SILTY CLAY

GENERAL NOTES:

MULTIPLE PIPE CULVERTS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF $\frac{1}{2} D_o$ OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".

CLASS I AND CLASS II REINFORCED CONCRETE PIPE SHALL ONLY BE USED FOR SEWERS IN TRENCHES OUTSIDE ROADBED AND STREET LIMITS.

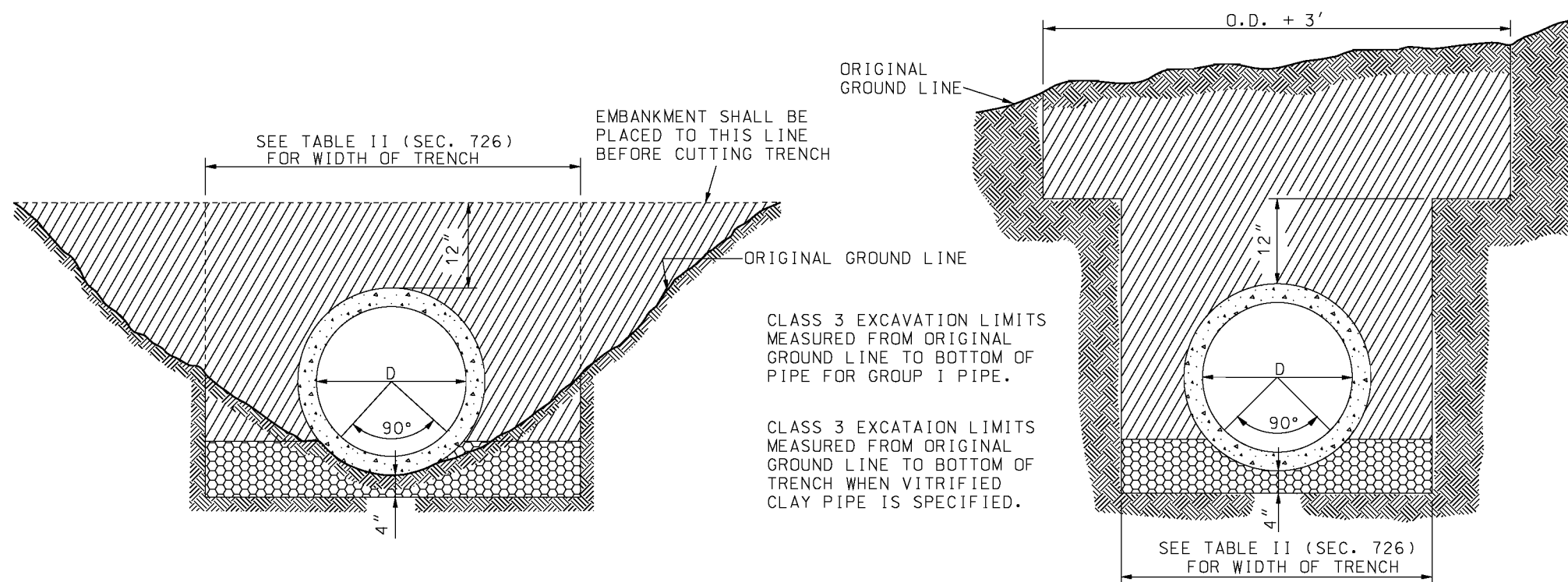
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RIGID CULVERT INSTALLATION METHODS
REINFORCED CONCRETE PIPE CULVERTS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

726.30J

SHEET NO.
1 OF 2




- LEGEND**
- COMPACTED ROADWAY EMBANKMENT
 - SUITABLE BACKFILL
 - LOOSE DRY MATERIAL
 - COMPACTED SAND

EXTRA STRENGTH

STANDARD STRENGTH

| HEIGHT OF FILL OVER V.C. PIPE CULVERTS | | | | | | |
|--|--|-------------------------------------|-------------------------------------|--|-------------------------------------|-------------------------------------|
| NOMINAL PIPE DIAMETER (INCH) | STANDARD STRENGTH | | | EXTRA STRENGTH | | |
| | TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET) | MINIMUM FILL HEIGHT (FEET) | MAXIMUM FILL HEIGHT (FEET) | TRENCH WIDTH AT ONE FOOT ABOVE TOP OF PIPE (FEET) | MINIMUM FILL HEIGHT (FEET) | MAXIMUM FILL HEIGHT (FEET) |
| 6 | 2.0 | 1.0 | 9.0 | | | |
| 8 | 2.0 | 1.0 | 7.0 | 2.5 | 4.0 | 12.0 |
| 10 | 2.5 | 1.0 | 7.0 | 2.5 | 4.0 | 12.0 |
| 12 | 2.7 | 1.0 | 6.0 | 3.0 | 4.0 | 13.0 |
| 15 | 3.5 | 1.0 | 6.0 | 3.0 | 4.0 | 17.0 |
| 18 | 3.5 | 1.0 | 6.0 | 3.5 | 4.0 | 17.0 |
| 21 | 4.0 | 1.0 | 6.0 | 4.0 | 4.0 | 17.0 |
| 24 | 4.0 | 1.0 | 8.0 | 4.0 | 3.0 | 19.0 |
| 30 | 4.5 | 1.0 | 10.0 | 4.5 | 3.0 | 19.0 |
| 36 | 5.0 | 1.0 | 11.0 | 5.0 | 3.0 | 19.0 |




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**RIGID CULVERT
INSTALLATION METHODS**

VITRIFIED CLAY
PIPE CULVERTS



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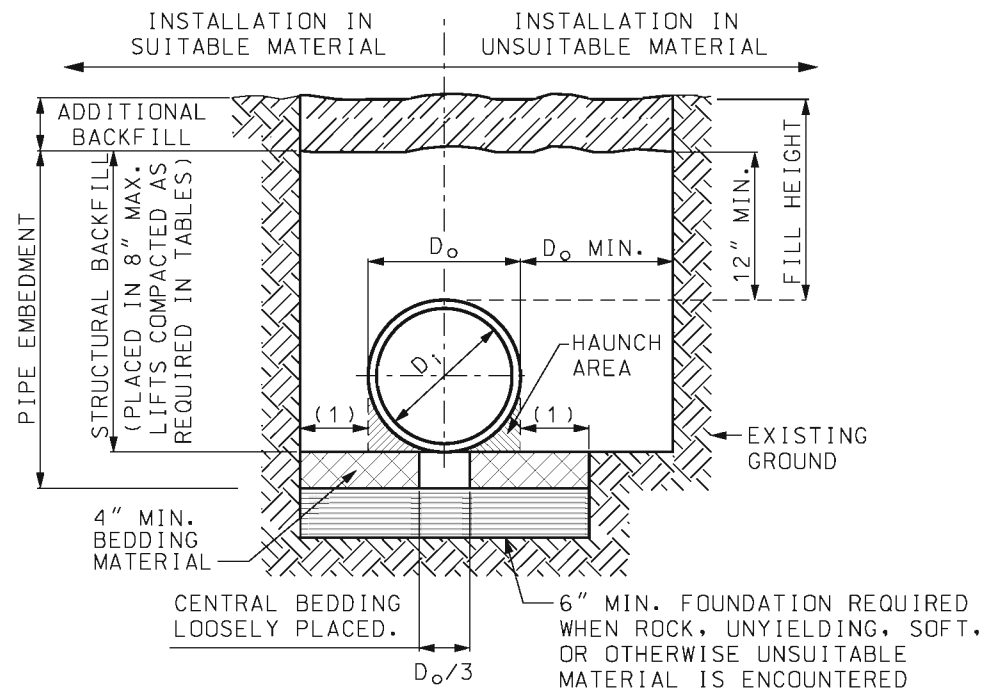
726.30J

SHEET NO.
2 OF 2

DATE EFFECTIVE: 04/01/2015

DATE PREPARED: 2/20/2015

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

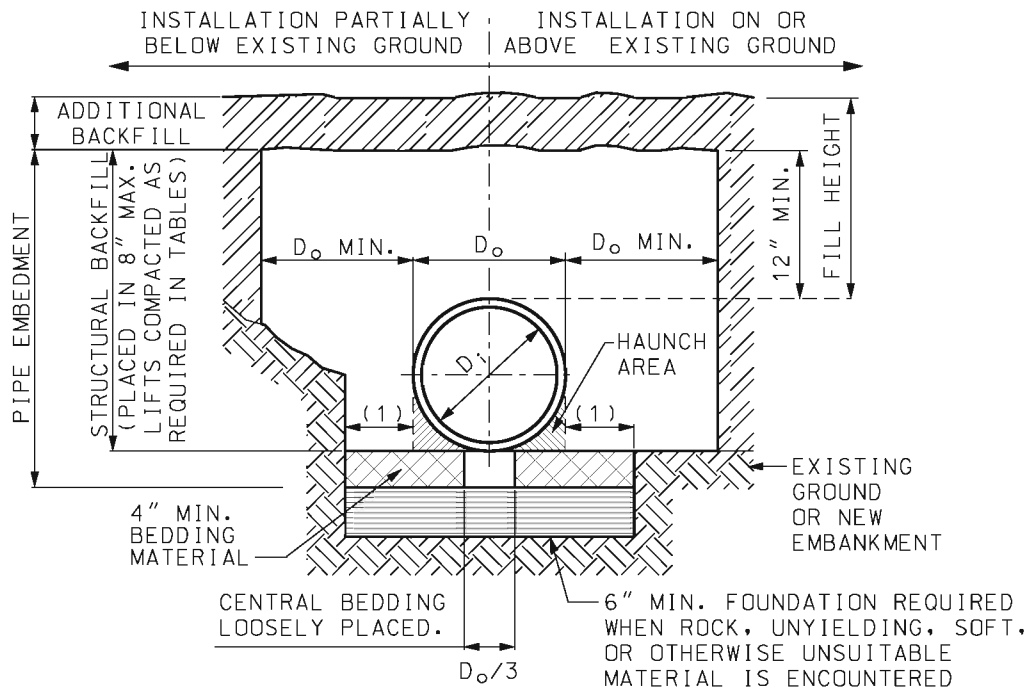


TRENCH INSTALLATION

LEGEND

D_i = INSIDE DIAMETER OF PIPE.
 D_o = OUTSIDE DIAMETER OF PIPE.
(1) = $(D_o/4)+6"$ (MIN.)

NOTE:
MULTIPLE PIPE SHALL BE INSTALLED WITH A MINIMUM CLEARANCE BETWEEN PIPES OF $\frac{1}{2} D_o$ OR 12", WHICHEVER IS GREATER, BUT NOT TO EXCEED 36".



EMBANKMENT INSTALLATION

CONSTRUCTION SEQUENCE

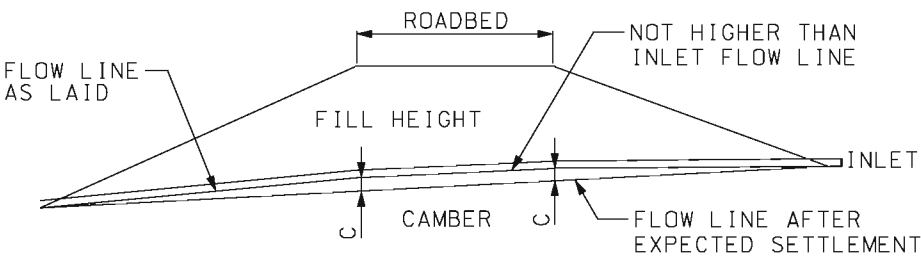
1. PLACE BEDDING MATERIAL TO GRADE.
2. COMPACT BEDDING OUTSIDE THE MIDDLE THIRD OF THE PIPE.
3. INSTALL PIPE TO GRADE.
4. COMPLETE STRUCTURAL BACKFILL ACCORDING TO SPECIFICATIONS.

| FILL HEIGHT LIMITS | | | | | | | | | | | | | | | |
|---|-------------------------------------|--------------------|------|--------------------|------|-------------------------------|------|--------------------|------|--------------------|------|---------------------------|------|--------------------|------|
| STRUCTURAL BACKFILL | SPECIFIED NOMINAL DIA OF PIPE (IN.) | POLYETHYLENE | | | | STEEL REINFORCED POLYETHYLENE | | POLYVINYL | | | | DOUBLE WALL POLYPROPYLENE | | | |
| | | COMPACTION 90% SPD | | COMPACTION 95% SPD | | COMPACTION 90% SPD | | COMPACTION 90% SPD | | COMPACTION 95% SPD | | COMPACTION 90% SPD | | COMPACTION 95% SPD | |
| | | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| GRAVEL (AASHTO M145 SOIL TYPE A1 & A3) | 12 | 2' | 19' | 2' | 26' | -- | -- | 2' | 32' | 2' | 61' | 2' | 21' | 2' | 29' |
| | 15 | 2' | 19' | 2' | 27' | -- | -- | 2' | 32' | 2' | 55' | 2' | 22' | 2' | 31' |
| | 18 | 2' | 17' | 2' | 25' | -- | -- | 2' | 31' | 2' | 60' | 2' | 19' | 2' | 27' |
| | 24 | 2' | 15' | 2' | 21' | 2' | 50' | 2' | 30' | 2' | 54' | 2' | 16' | 2' | 22' |
| | 30 | 2' | 17' | 2' | 24' | 2' | 50' | 2' | 31' | 2' | 52' | 2' | 11' | 2' | 15' |
| | 36 | 2' | 13' | 2' | 19' | 2' | 50' | 2' | 30' | 2' | 53' | -- | -- | -- | -- |
| | 42 | 2' | 13' | 2' | 19' | 2' | 50' | -- | -- | -- | -- | -- | -- | 2' | 15' |
| | 48 | 2' | 12' | 2' | 18' | 2' | 30' | -- | -- | -- | -- | -- | -- | 2' | 12' |
| COURSE SAND (AASHTO M145 SOIL TYPE A-1-b) | 12 | 2' | 17' | 2' | 23' | -- | -- | 2' | 32' | 2' | 55' | 2' | 18' | 2' | 24' |
| | 15 | 2' | 16' | 2' | 22' | -- | -- | 2' | 32' | 2' | 49' | 2' | 22' | 2' | 31' |
| | 18 | 2' | 15' | 2' | 21' | -- | -- | 2' | 31' | 2' | 53' | 2' | 16' | 2' | 21' |
| | 24 | 2' | 14' | 2' | 20' | 2' | 50' | 2' | 30' | 2' | 48' | 2' | 13' | 2' | 17' |
| | 30 | 2' | 13' | 2' | 19' | 2' | 50' | 2' | 31' | 2' | 46' | 2' | 7' | 2' | 10' |
| | 36 | 2' | 12' | 2' | 17' | 2' | 50' | 2' | 30' | 2' | 46' | -- | -- | -- | -- |
| | 42 | 2' | 13' | 2' | 18' | 2' | 50' | -- | -- | -- | -- | -- | -- | 2' | 19' |
| | 48 | 2' | 12' | 2' | 17' | 2' | 30' | -- | -- | -- | -- | -- | -- | 2' | 12' |
| SILTY SAND OR SILTY GRAVEL (AASHTO M145 SOIL TYPES A-2-4 & A-2-5) | 12 | 3.3' | 10' | 2' | 17' | -- | -- | 2.7' | 16' | 2' | 33' | 2.8' | 11' | 2' | 19' |
| | 15 | 3.4' | 10' | 2' | 16' | -- | -- | 2.7' | 16' | 2' | 33' | 2.8' | 11' | 2' | 23' |
| | 18 | 3.6' | 10' | 2' | 15' | -- | -- | 2.7' | 15' | 2' | 32' | 3' | 11' | 2' | 16' |
| | 24 | 3.8' | 9' | 2' | 14' | 2' | 50' | 2.7' | 15' | 2' | 31' | 3.3' | 10' | 2' | 13' |
| | 30 | 3.7' | 10' | 2' | 14' | 2' | 50' | 2.8' | 15' | 2' | 31' | 3.4' | 6' | 2' | 7' |
| | 36 | 4.2' | 7' | 2' | 12' | 2' | 50' | 2.8' | 14' | 2' | 31' | -- | -- | -- | -- |
| | 42 | 4.2' | 7' | 2' | 13' | 2' | 50' | -- | -- | -- | -- | -- | -- | 3.3' | 10' |
| | 48 | 4.5' | 6' | 2' | 12' | 2' | 30' | -- | -- | -- | -- | -- | -- | 3.1' | 9' |
| | 60 | 3.3' | 7' | 2' | 14' | 2' | 30' | -- | -- | -- | -- | -- | -- | 2' | 10' |

MINIMUM COVER FOR CONSTRUCTION LOADS

| NOMINAL PIPE DIA. (IN.) | MINIMUM COVER (FT) FOR INDICATED AXLE LOADS (THOUSANDS OF POUNDS) | | | |
|-------------------------|---|-------|--------|---------|
| | 18-50 | 50-75 | 75-110 | 110-150 |
| 12-36 | 2.0 | 2.5 | 3.0 | 3.0 |
| 42-60 | 3.0 | 3.0 | 3.5 | 4.0 |

MINIMUM COVER LIMITS ARE NOT SUFFICIENT FOR SILTY SAND OR SILTY GRAVEL STRUCTURAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY. THE CONTRACTOR SHALL PROVIDE MINIMUM COVER PLUS ANY ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. IN UNPAVED SITUATIONS, THE SURFACE MUST BE MAINTAINED TO A LEVEL AND NON-RUTTED CONDITION.



NOTE:
ON YIELDING SOIL, PIPE CULVERTS SHALL BE PLACED ON A CAMBERED FLOW LINE. THE AMOUNT OF CAMBER WILL VARY WITH SOIL CONDITION AND WILL BE SPECIFIED ON THE DESIGN PLANS.

TYPICAL CAMBERED FLOW LINE

NOTE:

SPD = STANDARD PROCTOR DENSITY.

FILL HEIGHT MEASURED FROM THE TOP OF PIPE TO SURFACE.

LIMITS ACCOUNT FOR SHORT-TERM TEMPORARY WATER TABLE DEPTHS OF FIVE FEET ABOVE SPRINGLINE. TABLES ARE NOT APPLICABLE FOR LONG-TERM PERMANENT WATER TABLE DEPTHS ABOVE SPRINGLINE.

WHEN PIPES ARE USED AS GROUP A, FILL HEIGHTS ARE LIMITED TO SHADED VALUES.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

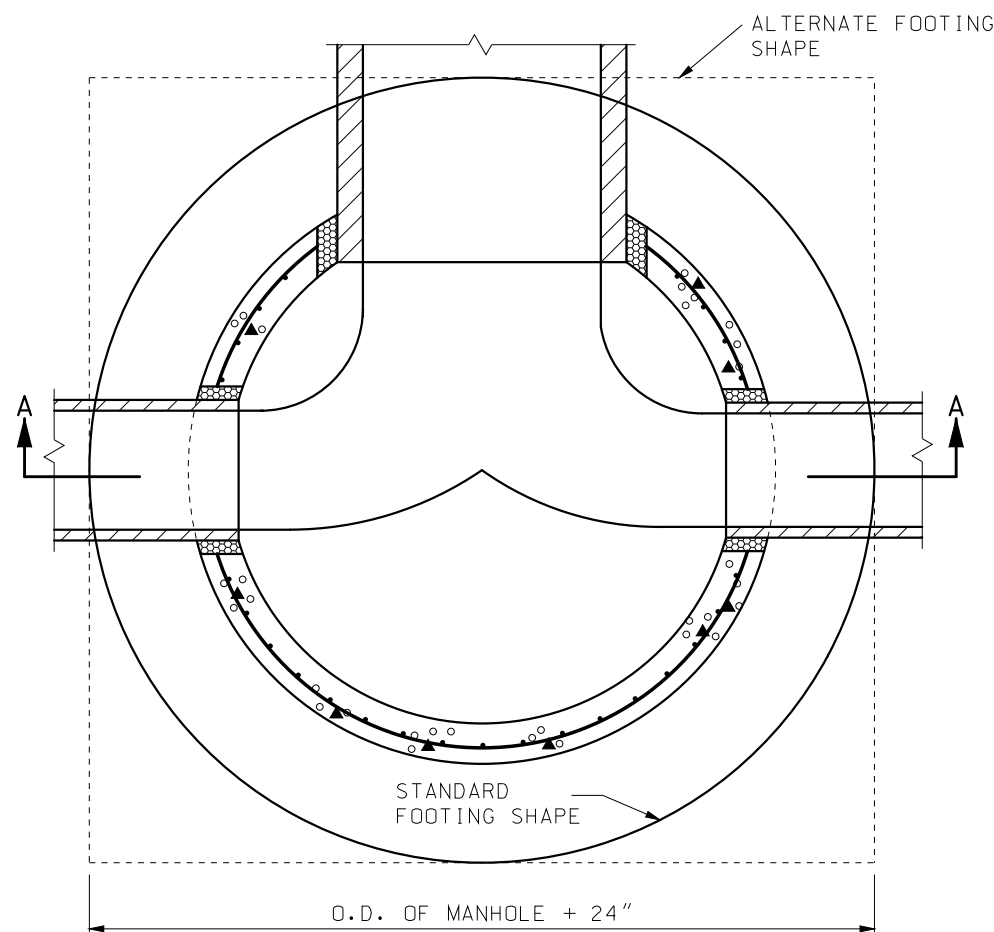
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

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THERMOPLASTIC PIPE INSTALLATION METHODS

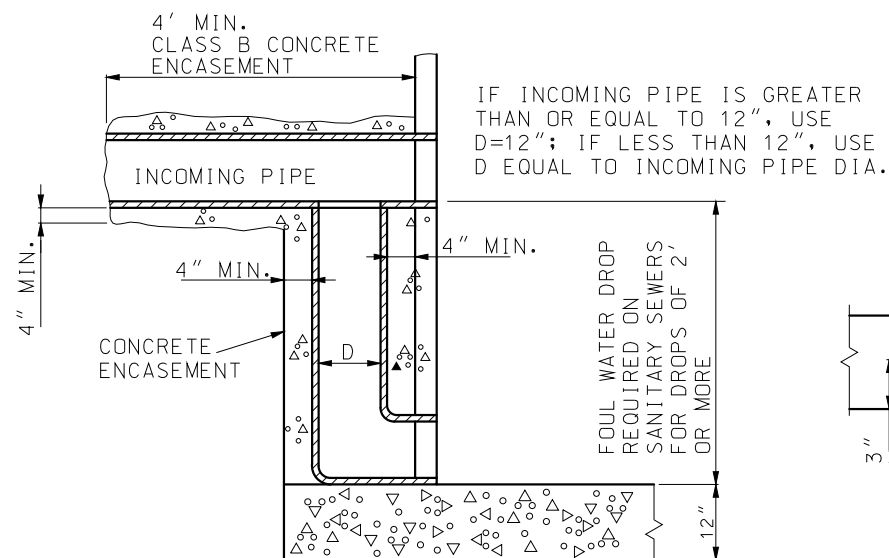
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| DATE EFFECTIVE: | 04/01/2015 | 730.00E | SHEET NO. 1 OF 1 |
| DATE PREPARED: | 2/27/2015 | | |



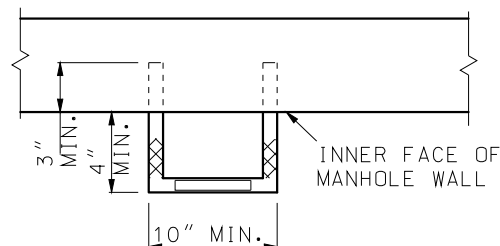
PLAN OF FOOTING

| BASE SECTION DIMENSIONS* | |
|--------------------------|-----------|
| SIZE OF PIPE | MIN. DIA. |
| 24" OR SMALLER | 48" |
| 30" - 36" | 60" |
| 42" - 48" | 72" |

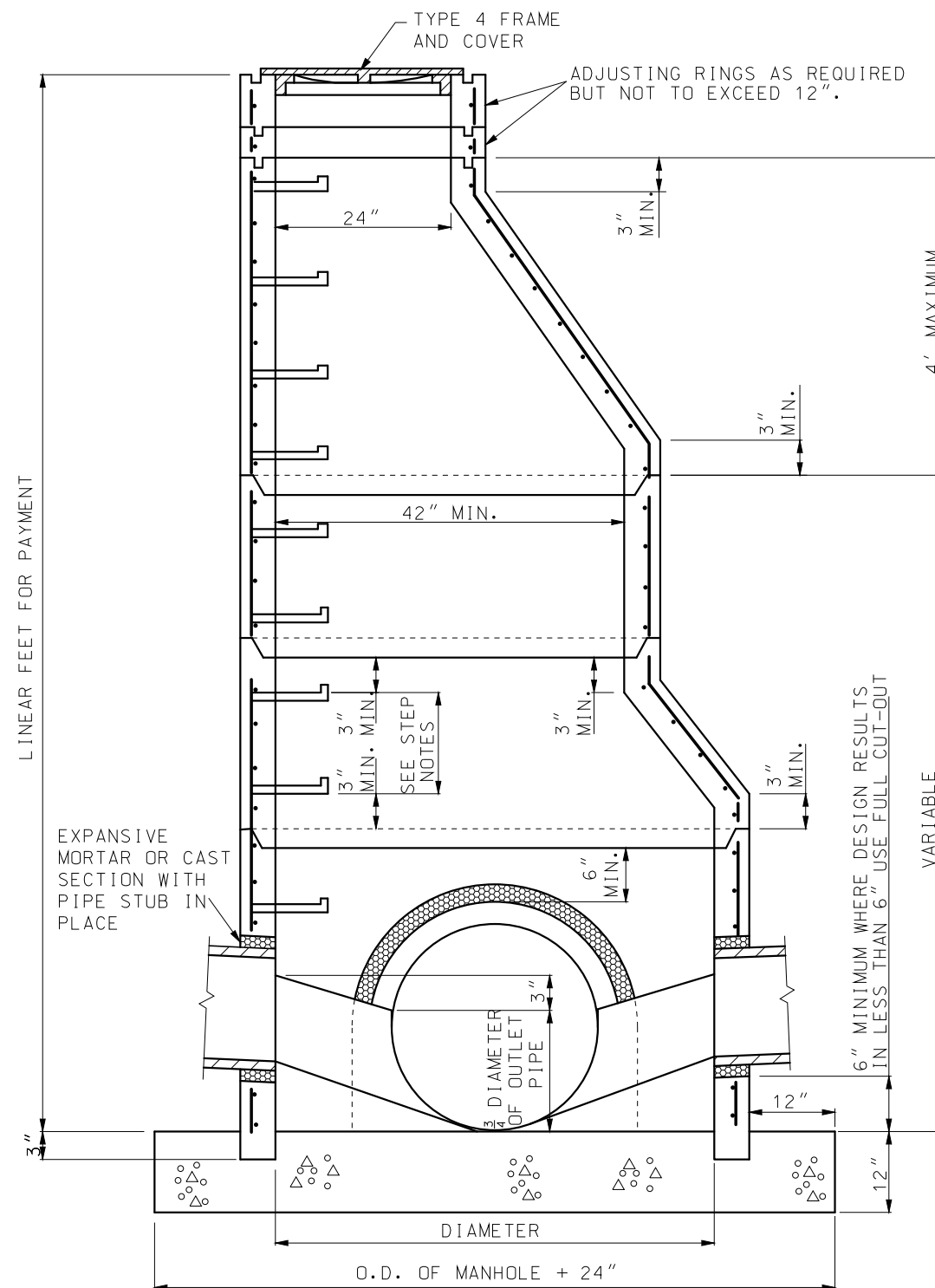
* RISER SECTIONS SHALL NOT BE LESS THAN 42" DIAMETER.



FOUL WATER DROP



STEP INSTALLATION



SECTION A-A

STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF 16" MAXIMUM IN ALL MANHOLES HAVING A DEPTH OF MORE THAN 4'. STEPS SHALL BEGIN AT AN ELEVATION 6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE LEVEL AND IN VERTICAL ALIGNMENT.

NO DIRECT PAYMENT WILL BE MADE FOR MANHOLE STEPS.

GENERAL NOTES:

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE MANHOLES, IN ACCORDANCE WITH THE CONCRETE MANHOLE STANDARD.

IF THE CONTRACTOR ELECTS TO CAST IN PLACE THE MANHOLES, PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE FOR PRECAST MANHOLES.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH AN ESTABLISHED MANUFACTURING PROCEDURE.

FORMED OR CUT OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

THE TOP OF THE INLET SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.

REINFORCEMENT SHALL BE CUT AT PIPE OPENINGS.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE, NOR FOR CUTTING AND BENDING REINFORCING STEEL.

WHERE THE WIDTH OF THE BASE SECTION IS GREATER THAN 42" AN ECCENTRIC TAPER SECTION MAY BE USED TO ALLOW THE USE OF 42" RISER SECTIONS.

THE LOWER TRANSITION SECTION AS SHOWN ON SECTION A-A IS OPTIONAL.

FOUL WATER DROPS ARE REQUIRED WHEN SPECIFIED IN THE PLANS. NO DIRECT PAYMENT WILL BE MADE FOR THE FOUL WATER DROP OR ITS ENCASEMENT.

SEE STANDARD PLAN 614.30 FOR MANHOLE FRAMES AND COVERS.

WHERE PIPES DO NOT ENTER OR EXIT RADially, USE NEXT LARGER SIZE MANHOLE. CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL LIMITS 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION ON THE MANHOLE. CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

ALL PIPE CONNECTED WITH A MANHOLE WILL BE MEASURED AND PAID FOR TO THE INSIDE WALL OF THE MANHOLE.

CIRCUMFERENTIAL REINFORCEMENT SIZE AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS TO A MAXIMUM DEPTH OF 20 FEET. OVER 20 FOOT DEPTH CIRCUMFERENTIAL REINFORCEMENT IS INCREASED TO 0.24 SQUARE INCHES STEEL REQUIRED PER LINEAR FOOT, TO A MAXIMUM DEPTH OF 30 FEET.

FOR PIPE CONNECTIONS, A RUBBER GASKET IN ACCORDANCE WITH ASTM RUBBER GASKET SPECIFICATIONS C-443 OR C-923 AND CAST INTEGRALLY IN MANHOLE MAY BE USED AS AN ALTERNATE TO EXPANSIVE MORTAR.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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JEFFERSON CITY, MO 65102
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PRECAST MANHOLES

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER PE-28411

PROFESSIONAL ENGINEER

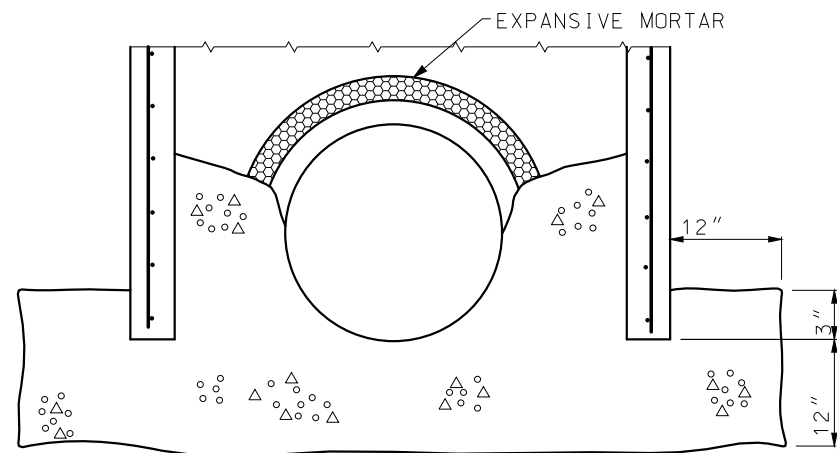
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DATE EFFECTIVE: 07/01/2016

DATE PREPARED: 5/13/2016

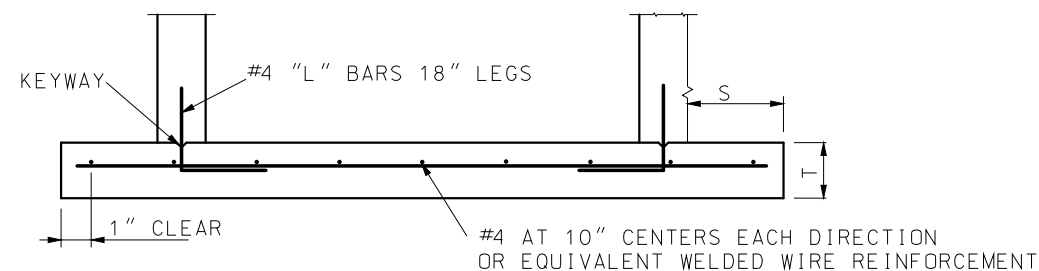
731.00U

SHEET NO. 1 OF 2



ALTERNATE FOOTING

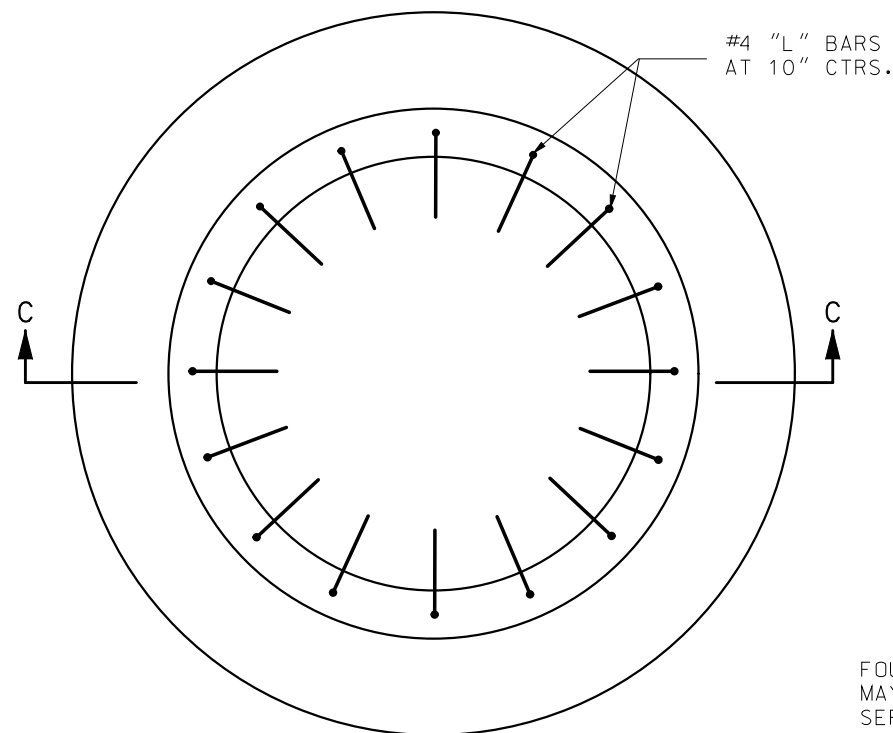
PRECAST BASE SECTION SET ON CONCRETE BLOCKS FOUNDATION SLAB AND INVERT POURED MONOLITHIC.



SECTION C-C

S = 0 FOR DEPTHS LESS THAN OR EQUAL TO 6';
S = 9" FOR DEPTHS GREATER THAN 6'.

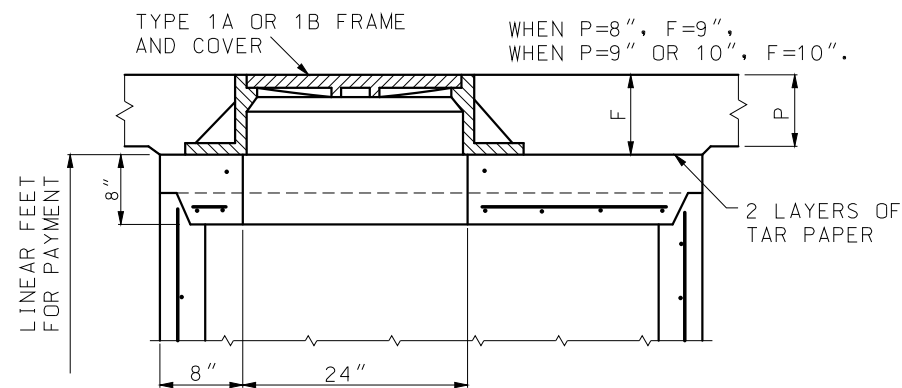
T = 6" FOR DEPTHS OR LESS THAN OR EQUAL TO 6';
T = 9" FOR DEPTHS GREATER THAN 6'.



PRECAST FOUNDATION SLAB

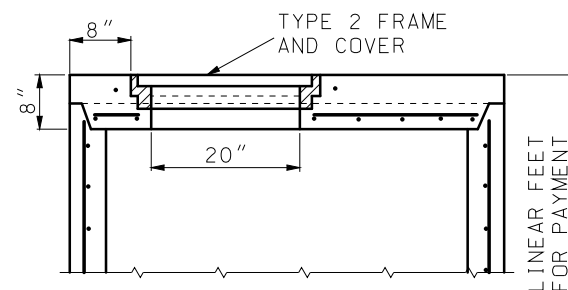
FOUNDATION SLAB AND BASE SECTION MAY BE POURED MONOLITHIC OR SEPARATELY WITH A KEYWAY.

INVERT SHALL BE POURED AFTER PLACEMENT OF MANHOLE.



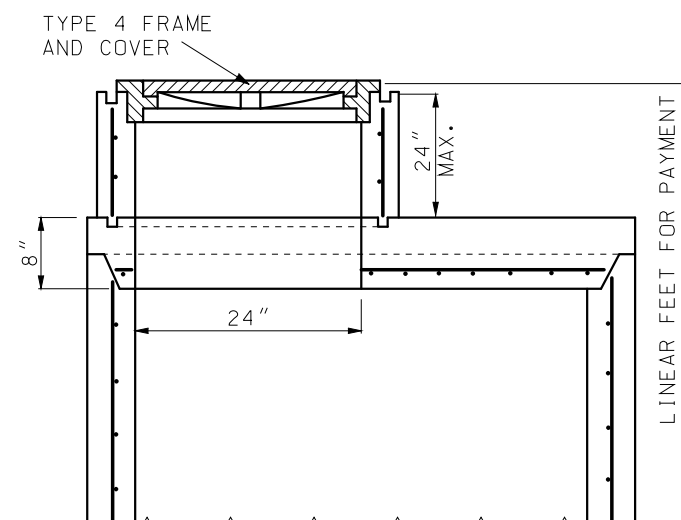
FLAT SLAB MANHOLE TOP (PAVED AREA)

SECTION B-B

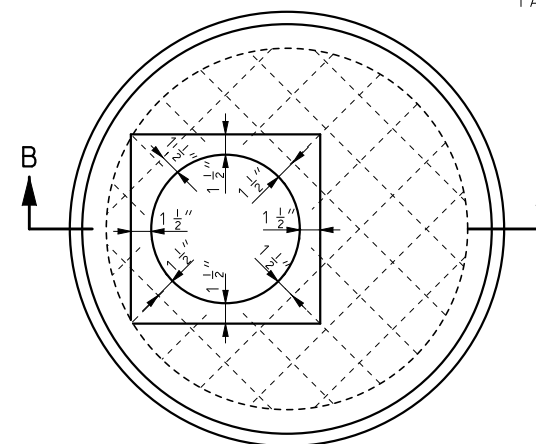


ALTERNATE SECTION B-B


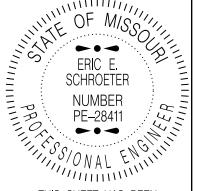
ALTERNATE FLAT SLAB MANHOLE TOP (UNPAVED AREA) USED WHERE DEPTH OF MANHOLE WILL NOT PERMIT USE OF CONE AND TAPER SECTIONS.

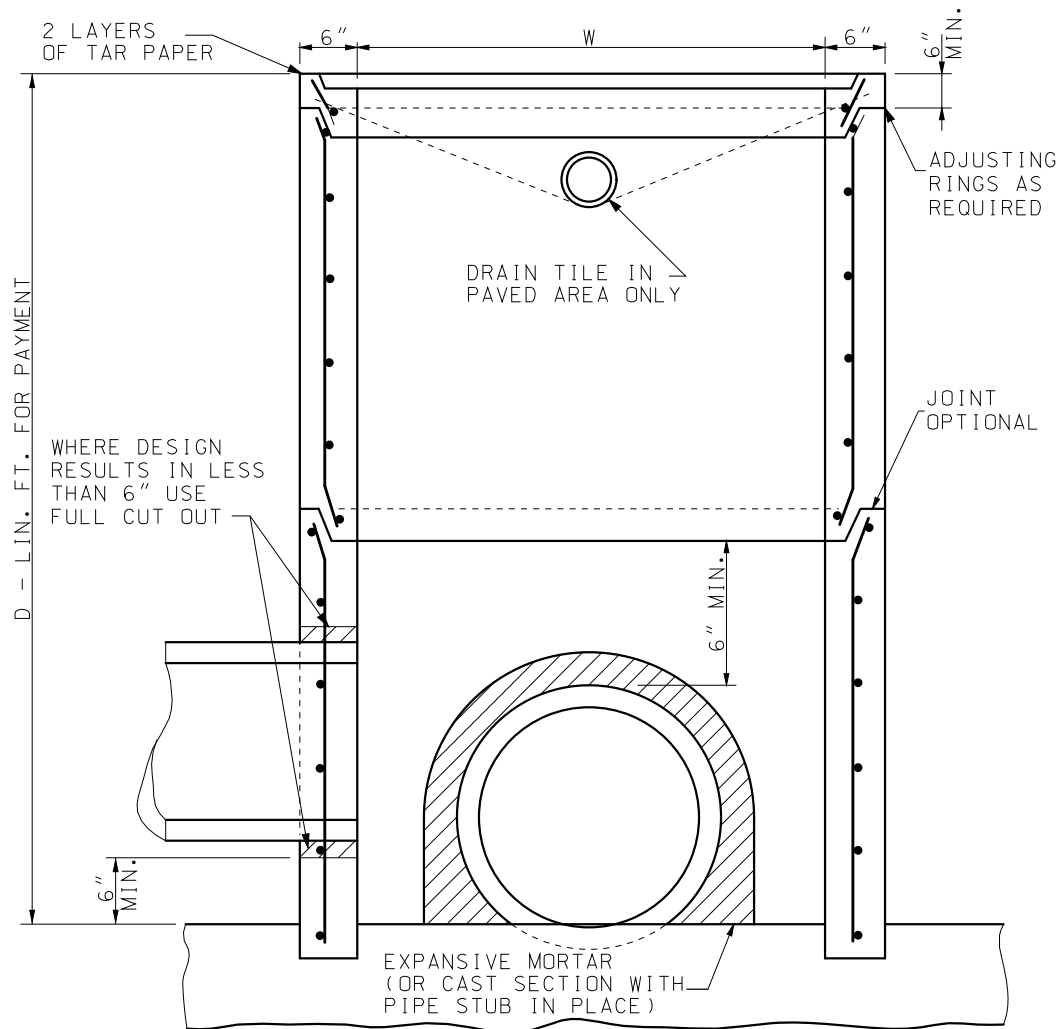


ALTERNATE MANHOLE TOP

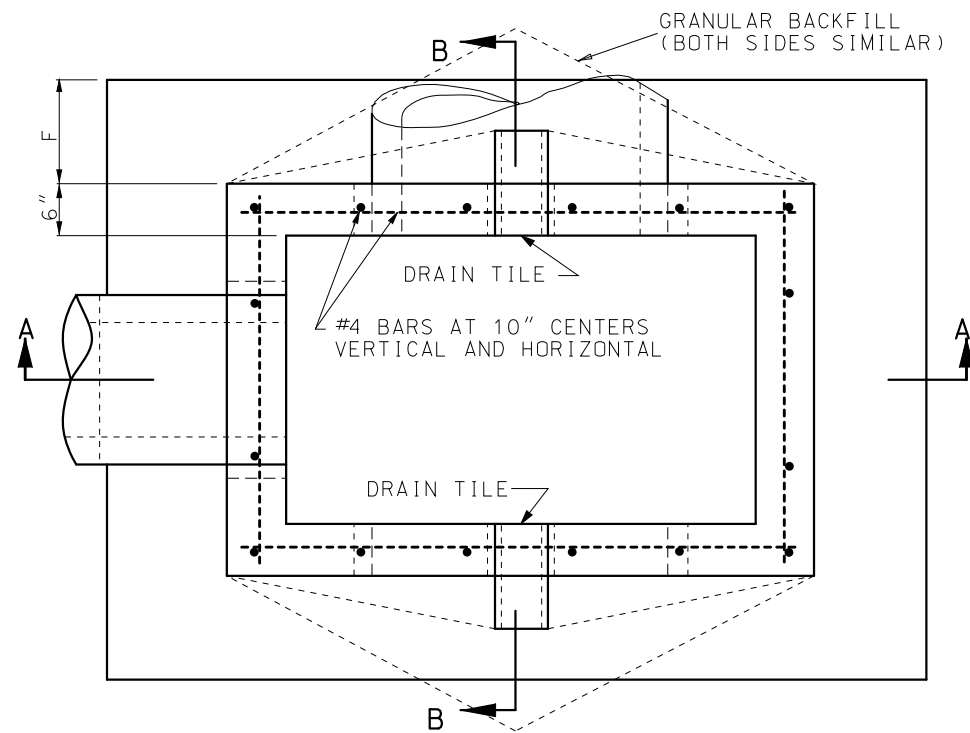


PLAN OF FLAT SLAB MANHOLE TOP

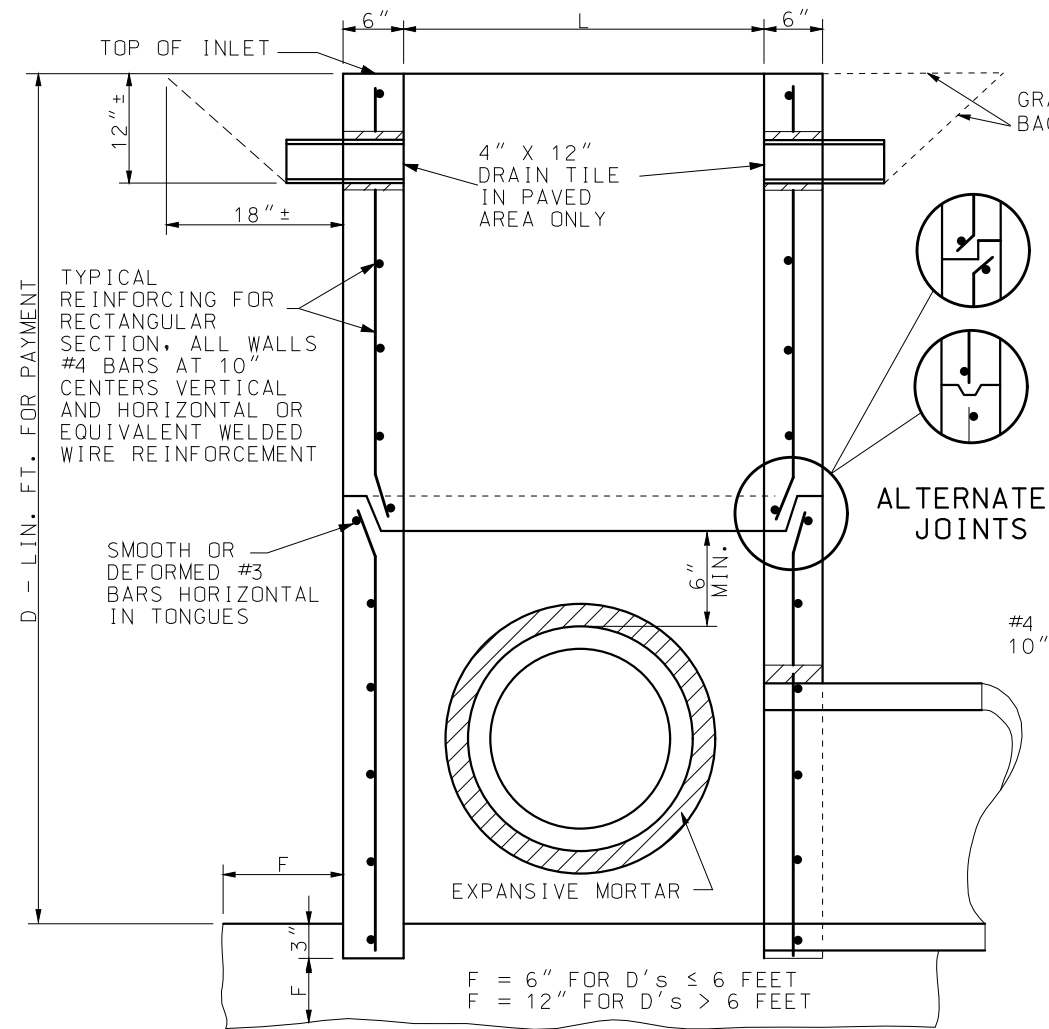
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|--|-------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | <p>PRECAST MANHOLES</p> |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 731.00U |
| SHEET NO. 2 OF 2 | |



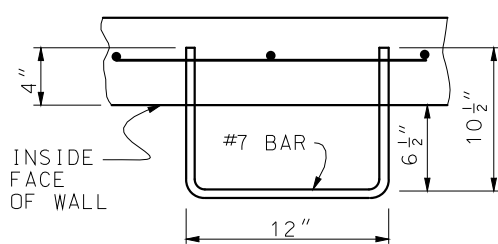
SECTION A-A



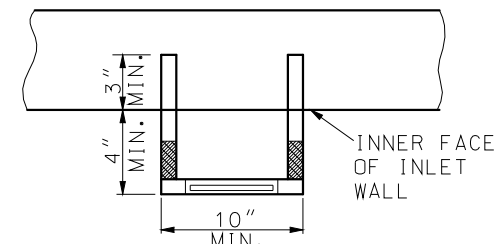
INLET PLAN



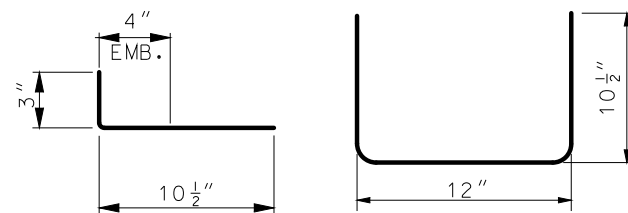
SECTION B-B



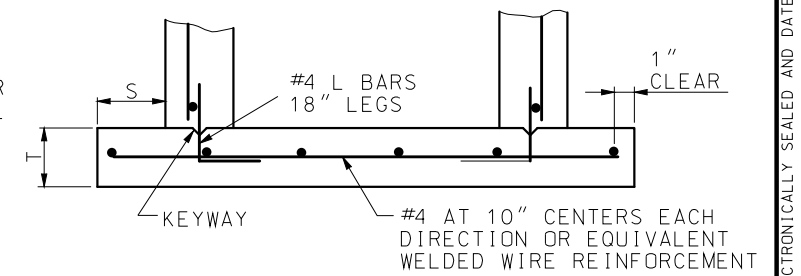
STEPS



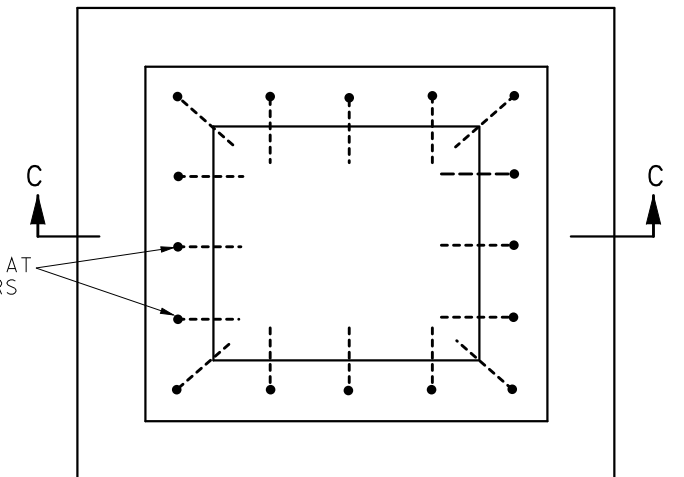
STEP INSTALLATION
(OTHER THAN STEEL BAR)



BENDING DIAGRAM
STEEL STEP BAR



SECTION C-C



$$S = 0 \text{ FOR } D \leq 6 \text{ FEET AND } 9''$$

$$\text{FOR } D > 6 \text{ FEET}$$

$$T = 6'' \text{ FOR } D \leq 6 \text{ FEET AND } 9''$$

$$\text{FOR } D > 6 \text{ FEET}$$

FOUNDATION SLAB AND BASE SECTION MAY BE POURED
MONOLITHIC OR SEPARATELY WITH A KEYWAY.

PRECAST FOUNDATION SLAB



GENERAL NOTES:

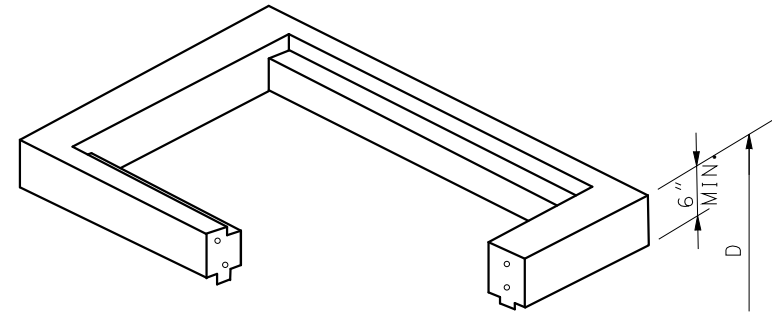
STEPS SHALL BE PLACED AT VERTICAL INTERVALS OF
16" MAXIMUM IN ALL INLETS HAVING A DEPTH OF MORE
THAN 4 FEET. STEPS SHALL BEGIN AT AN ELEVATION
6" ABOVE THE TOP OF THE OUTLET PIPE.

STEPS SHALL BE SET LEVEL AND IN VERTICAL ALIGNMENT
AND NOT NEARER THAT 3" TO A JOINT.

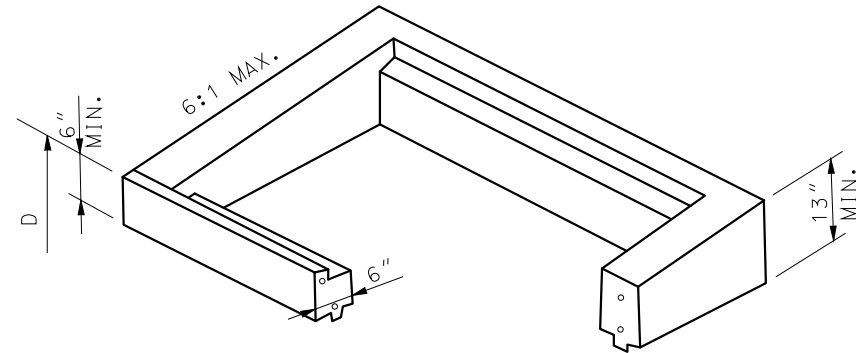
NO DIRECT PAYMENT WILL BE MADE FOR INLET STEPS.

STEPS ARE NOT REQUIRED FOR TYPE D INLETS.

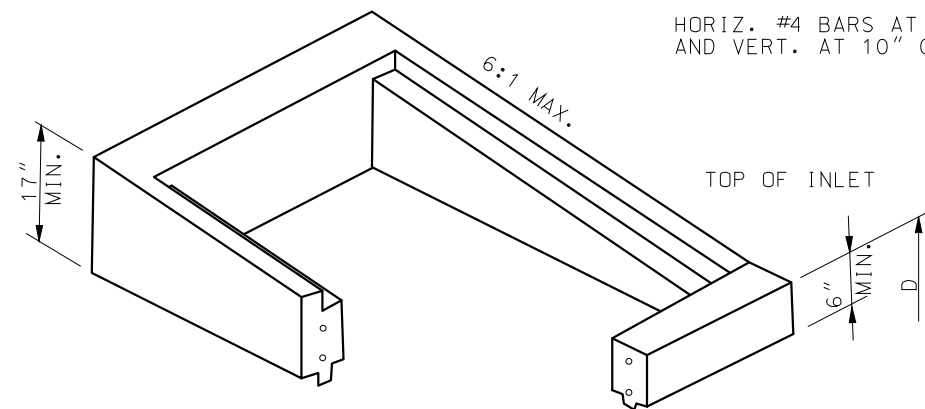
| | |
|--|---------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PRECAST DROP INLET |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 731.10S |
| SHEET NO. 1 OF 8 | |



TYPE S-1



TYPE S-2

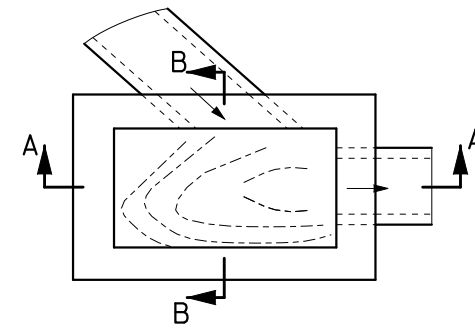


TYPE S-3

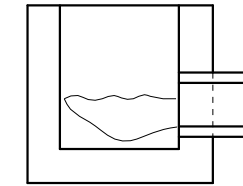
SEE STANDARD PLAN 614.10 FOR GRATES AND BEARING PLATES. TYPICAL LOCATION DETAILS ARE INDICATED ON SHEETS 7 AND 8 OF 8. TOP SECTIONS MAY BE CAST MONOLITHIC WITH BASE SECTION.

HORIZ. #4 BARS AT 6" CTRS.
AND VERT. AT 10" CTRS.

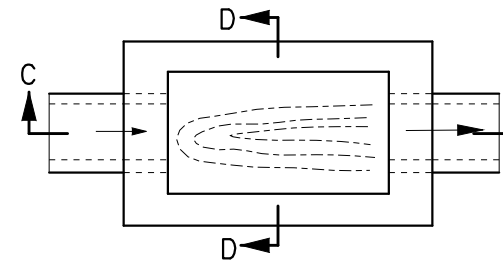
| DROP INLET | | |
|--------------|---------------|--------------------|
| WIDTH FT. | LENGTH FT. | TYPE |
| 2 | 2 | A, B, C |
| 4 | 2 | |
| 2 | 2 | D |
| 3 | 2 | E, S-1 S-2, S-3 |
| 3 | 3 | |
| 5 | 2 | |
| 5 | 3 | |



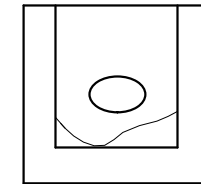
SECTION A-A



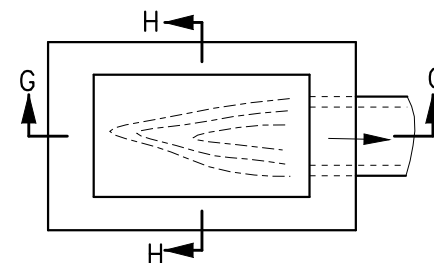
SECTION B-B



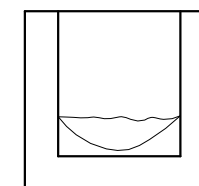
SECTION C-C



SECTION D-D

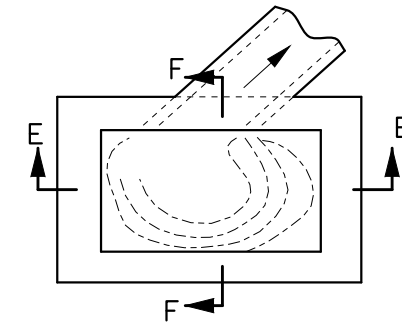


SECTION G-G

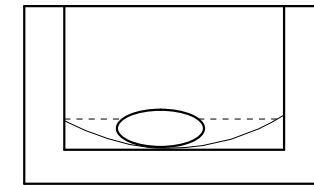


SECTION H-H

TYPICAL INVERTS




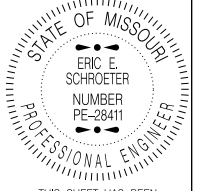
SECTION E-E

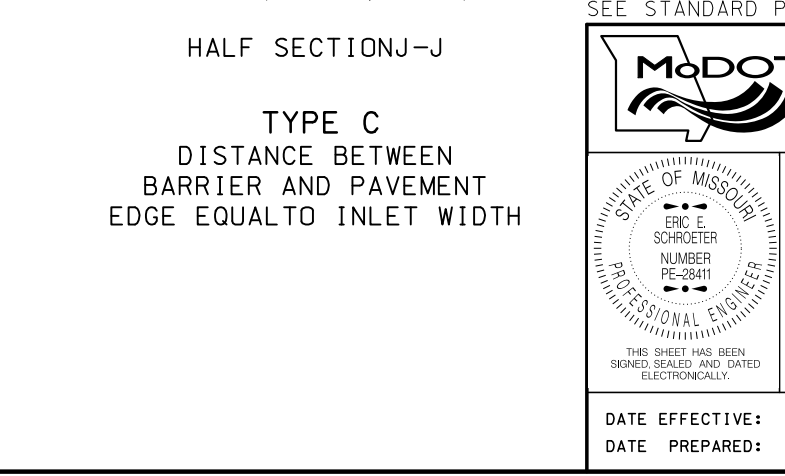
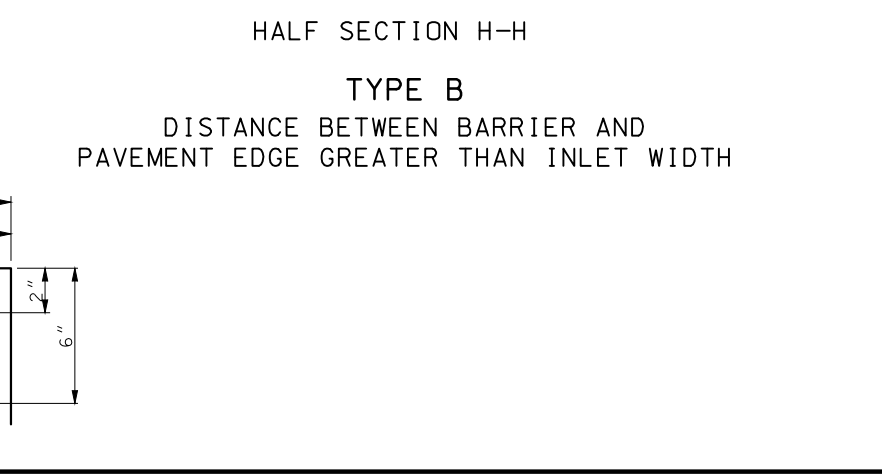
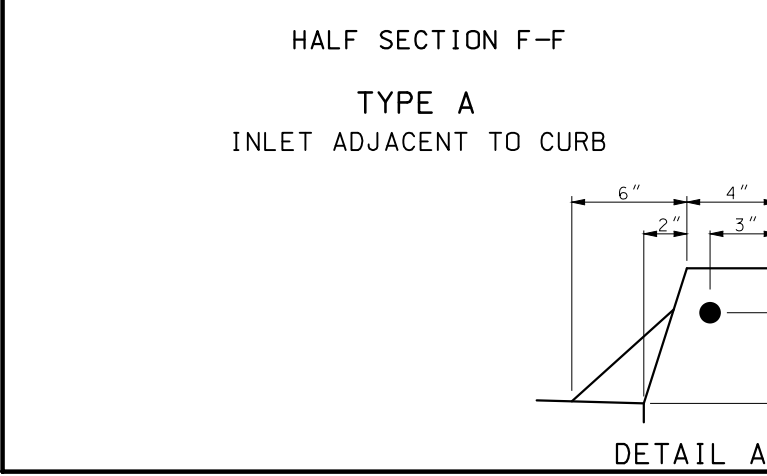
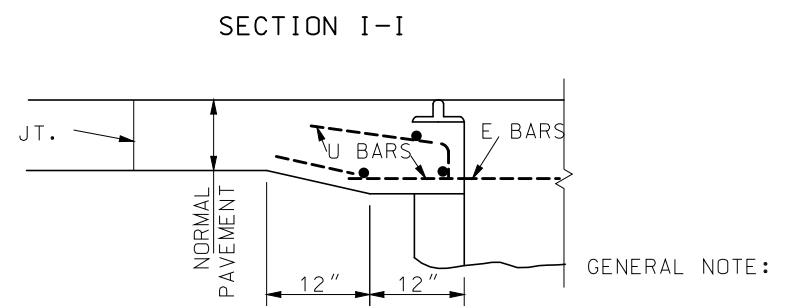
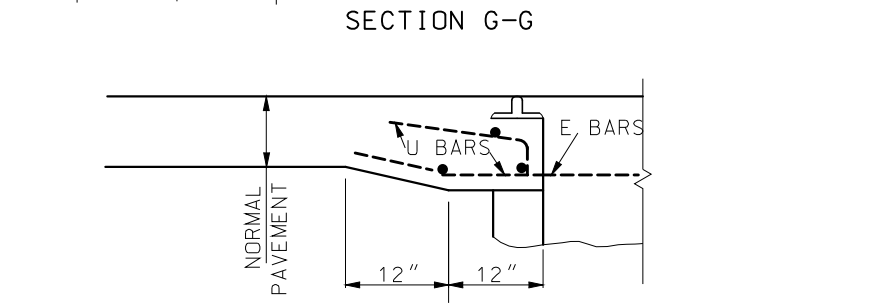
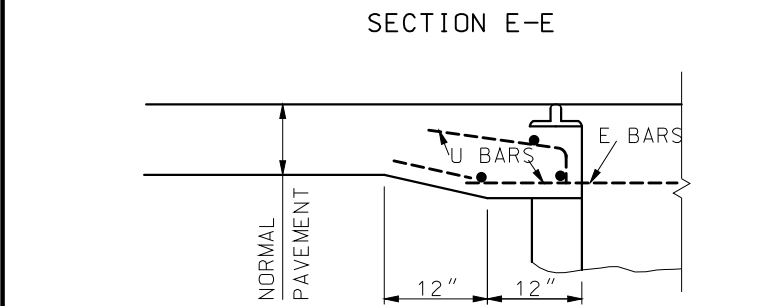
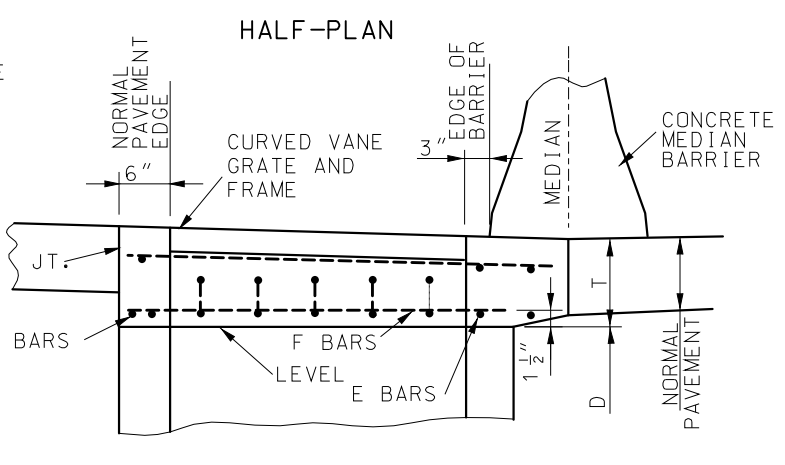
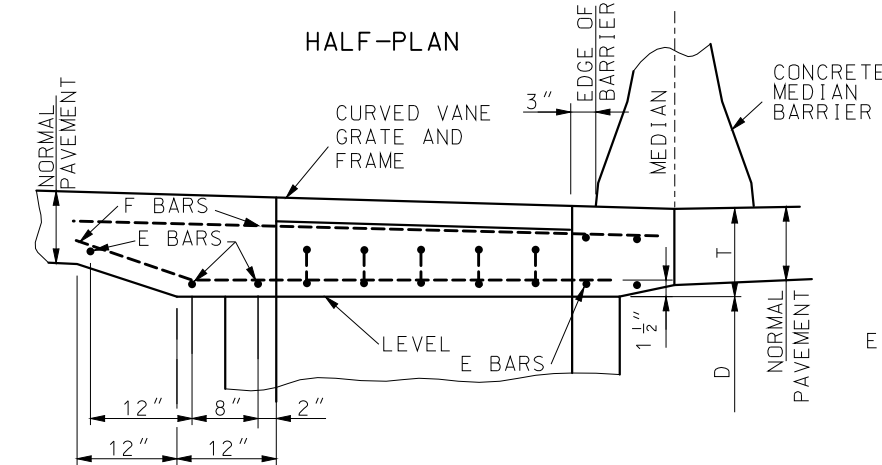
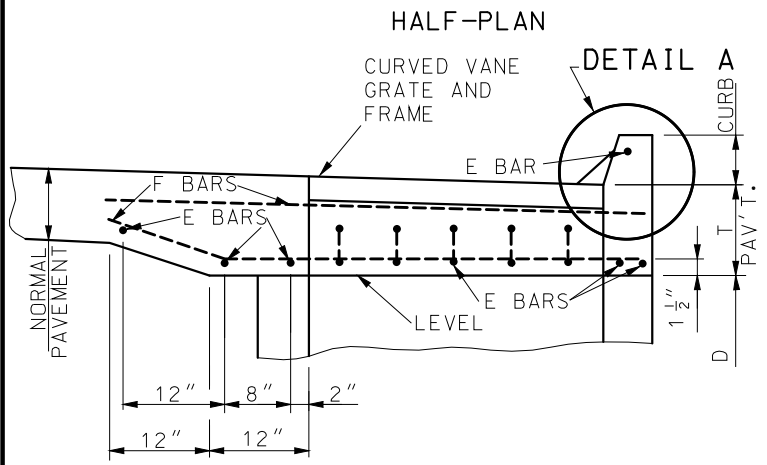
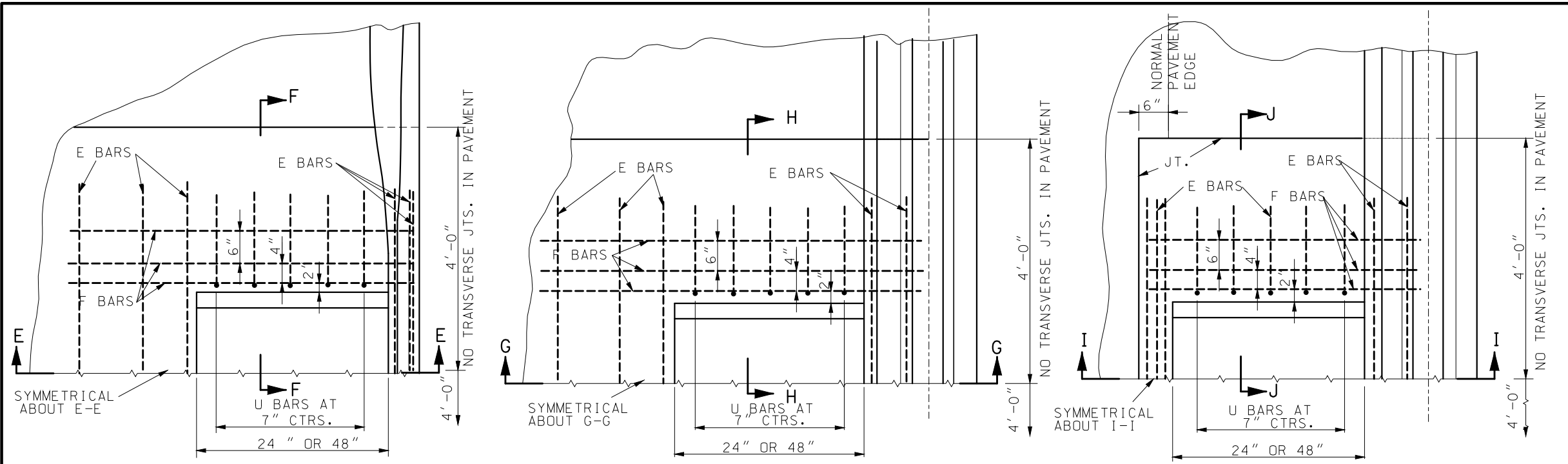


SECTION F-F

GENERAL NOTES:

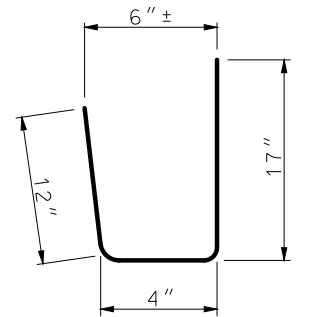
THE CONCRETE FOR INVERTS SHALL BE PLACED AFTER COMPLETION OF THE DROP INLET BOX. NO DIRECT PAYMENT WILL BE MADE FOR FURNISHING OR PLACING INVERT CONCRETE.

| | |
|--|----------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PRECAST DROP INLET</p> |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 731.10S |
| SHEET NO. 2 OF 8 | |



| PAVEMENT BAR BILL | | | | | |
|-------------------|-------|--------|------|-----|--------|
| TYPE | WIDTH | LENGTH | MARK | NO. | LENGTH |
| A | 4' | 2' | E | 6 | 6'-0" |
| | | | F | 6 | 6'-6" |
| | | | U | 14 | 2'-9" |
| | 2' | 2' | E | 6 | 6'-0" |
| | | | F | 6 | 4'-6" |
| | | | U | 8 | 2'-9" |
| B | 4' | 2' | E | 7 | 6'-0" |
| | | | F | 6 | 7'-0" |
| | | | U | 14 | 2'-9" |
| | 2' | 2' | E | 7 | 6'-0" |
| | | | F | 6 | 5'-0" |
| | | | U | 8 | 2'-9" |
| C | 4' | 2' | E | 7 | 6'-0" |
| | | | F | 6 | 5'-3" |
| | | | U | 14 | 2'-9" |
| | 2' | 2' | E | 7 | 6'-0" |
| | | | F | 6 | 3'-3" |
| | | | U | 8 | 2'-9" |
| D | 2' | 2' | E | 6 | 7'-0" |
| | | | F | 6 | 2'-9" |
| | | | U | 8 | 2'-9" |

BARS E, F, & U.....#4



U-BARS BENDING DIAGRAM

GENERAL NOTE:
SEE STANDARD PLAN 614.11 FOR CURVED VANE GRATE.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E. SCHROETER
NUMBER PE-28411
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

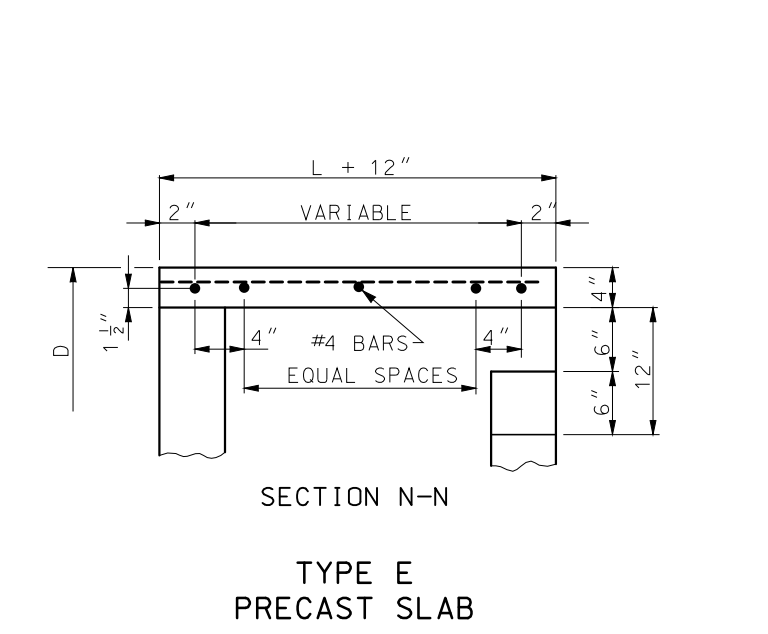
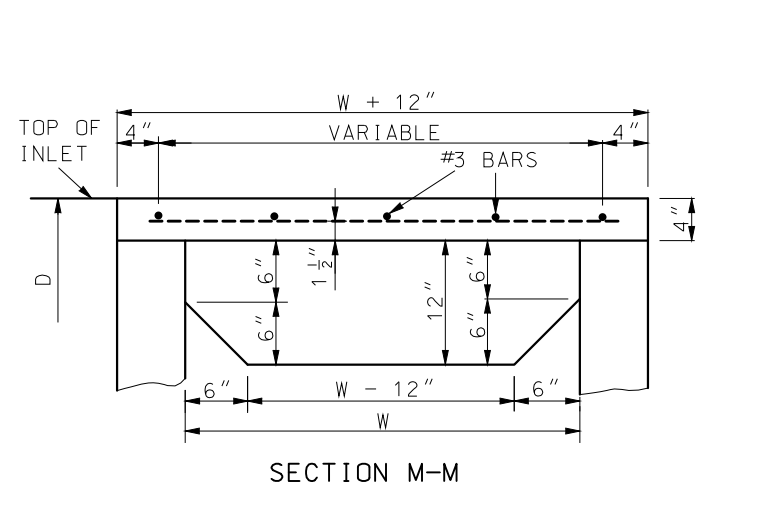
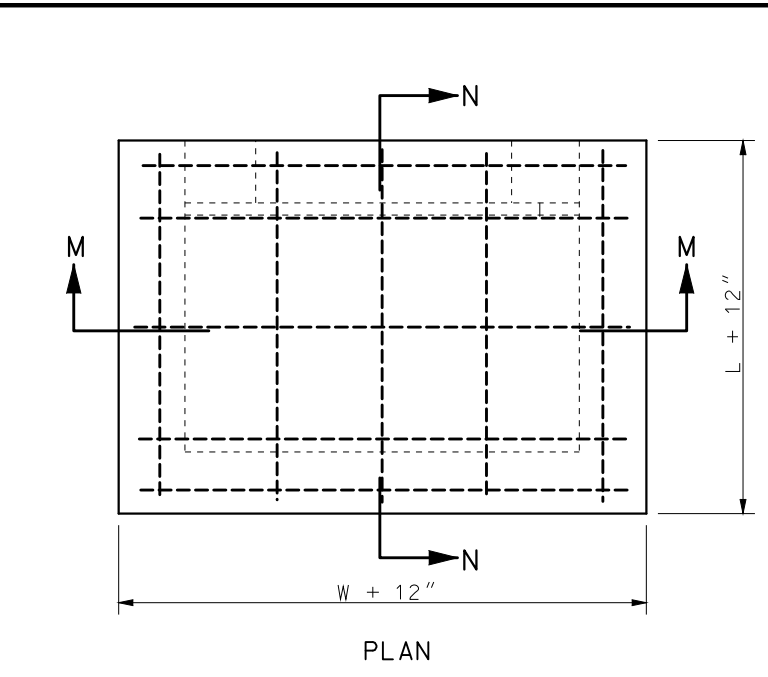
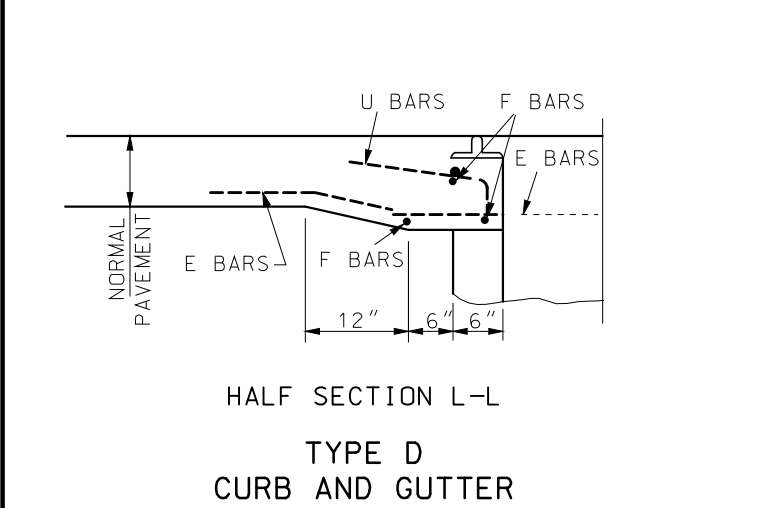
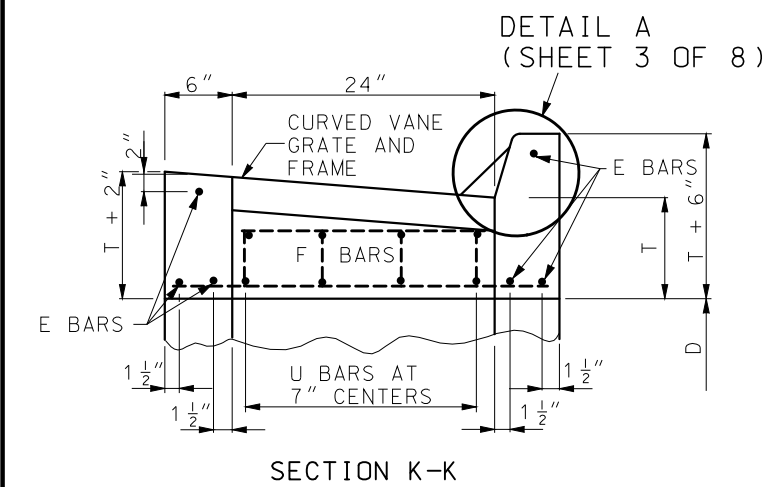
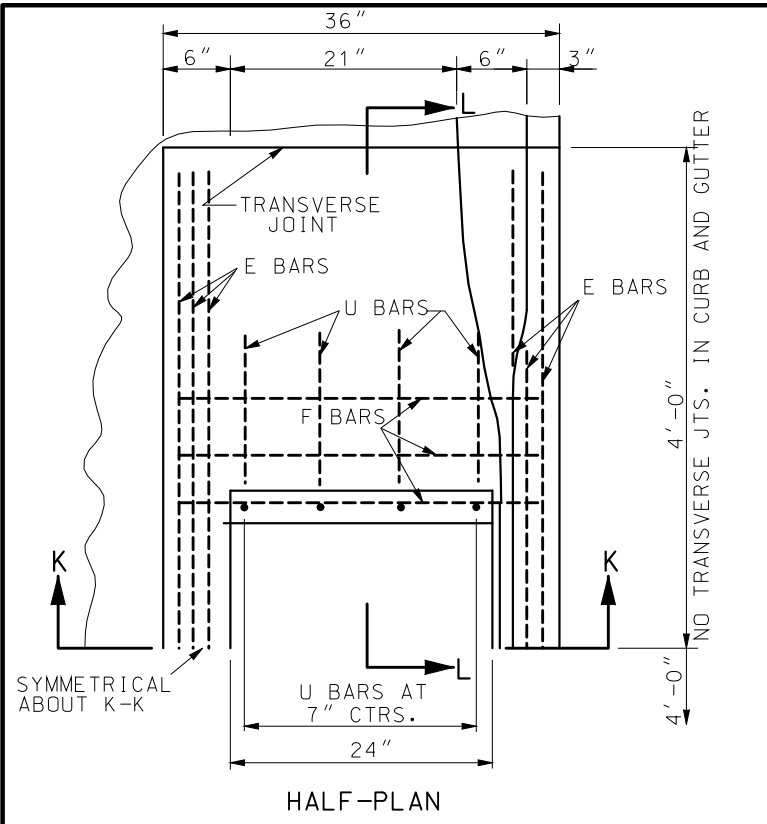
PRECAST DROP INLET COVERS

DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

731.10S

SHEET NO. 3 OF 8

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



| PAVEMENT THICKNESS | "T" DIMENSION |
|------------------------------|---------------|
| LESS THAN OR EQUAL TO 11" | 11" |
| 12" | 12" |
| 13" | 13" |
| GREATER THAN OR EQUAL TO 14" | 14" |

| TYPE E COVER BAR BILL | | | | |
|-----------------------|--------|----------|-----|--------|
| WIDTH | LENGTH | BAR SIZE | NO. | LENGTH |
| 3' | 2' | #3 | 5 | 2'-9" |
| | | #4 | 5 | 3'-9" |
| 3' | 3' | #3 | 5 | 3'-9" |
| | | #4 | 5 | 3'-9" |
| 5' | 2' | #3 | 6 | 2'-9" |
| | | #4 | 6 | 5'-9" |
| 5' | 3' | #3 | 6 | 3'-9" |
| | | #4 | 7 | 5'-9" |

GENERAL NOTES:

THE SIZE OF THE DROP INLET AND TYPE OF COVER WILL BE SHOWN ON THE PLANS.

THE CONFIGURATION DETAILS SHOWN ARE DESCRIPTIVE ONLY AND MAY BE VARIED TO CONFORM WITH ESTABLISHED MANUFACTURING PROCEDURES.

TOP OF DROP INLET WALL SHALL BE CONSTRUCTED TO THE ELEVATION OF BOTTOM OF SLAB AT THE EDGE OF PAVEMENT OR BOTTOM OF CURB AND GUTTER AT DROP INLET.

WHERE THE DROP INLET IS LOCATED IN AN UNPAVED AREA, THE TOP OF THE DROP INLET WALLS SHALL BE SET TO THE ELEVATION SHOWN ON THE PLANS.

ALL CONCRETE ABOVE THE TAR PAPER SEPARATION JOINT IS TO BE CONSTRUCTED DURING PAVING OPERATIONS OR CURB AND GUTTER CONSTRUCTION, AND WILL BE PAID FOR AS SQUARE YARDS OF CONCRETE PAVEMENT OR LINEAR FEET OF CURB AND GUTTER.

FORMED OR CUT-OUT OPENINGS SHALL BE PROVIDED WHERE PIPE INLETS AND OUTLETS ARE SHOWN ON THE PLANS.

REINFORCING BARS IN PAVEMENT SHALL BE EPOXY COATED AND SECURELY TIED TOGETHER AND FASTENED TO AVOID ANY POSSIBLE DISPLACEMENT DURING THE PLACING OF CONCRETE. REINFORCEMENT SHOWN IS IN ADDITION TO ANY REINFORCEMENT SHOWN FOR CONCRETE PAVEMENT OR CURB AND GUTTER.

JOINTS SHALL BE SEALED IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR WILL BE PERMITTED TO CAST IN PLACE THE DROP INLETS CALLED FOR IN THE PLANS, TO THE DIMENSIONS REQUIRED FOR PRECAST DROP INLETS.

WELDED WIRE REINFORCEMENT MAY BE IN LIEU OF REINFORCING BARS, THE REINFORCEMENT SHALL NOT BE LESS THAN .23 SQUARE INCHES PER LINEAR FOOT BOTH HORIZONTALLY AND VERTICALLY.

NO DIRECT PAYMENT WILL BE MADE FOR REINFORCING STEEL.

NO DIRECT PAYMENT WILL BE MADE FOR CUTTING PIPE NOR FOR CUTTING OR BENDING REINFORCING STEEL.

THE TOP OF INLET PIPES SHALL NOT BE SET BELOW THE TOP OF THE OUTLET PIPE.


NO DIRECT PAYMENT WILL BE MADE FOR FORMING FOR CURVED VANE GRATES AND FRAMES.

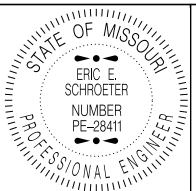
THE REINFORCEMENT SHOWN IS THE MINIMUM REQUIRED. AT THE CONTRACTOR'S OPTION, ADDITIONAL REINFORCEMENT MAY BE USED.

REINFORCING STEEL EDGE DISTANCE WILL BE 1 1/2" UNLESS OTHERWISE SPECIFIED.

NOT MORE THEN TWO LIFT HOLES OR LIFTING INSERTS MAY BE PROVIDED.

CLASS 3 EXCAVATION WILL BE PAID WITHIN VERTICAL PLANES 18" OUTSIDE OF THE OUTER WALLS OF THE BASE SECTION OF THE DROP INLETS, CLASS 3 EXCAVATION WILL NOT BE PAID FOR OUTSIDE THE FOOTING LIMITS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

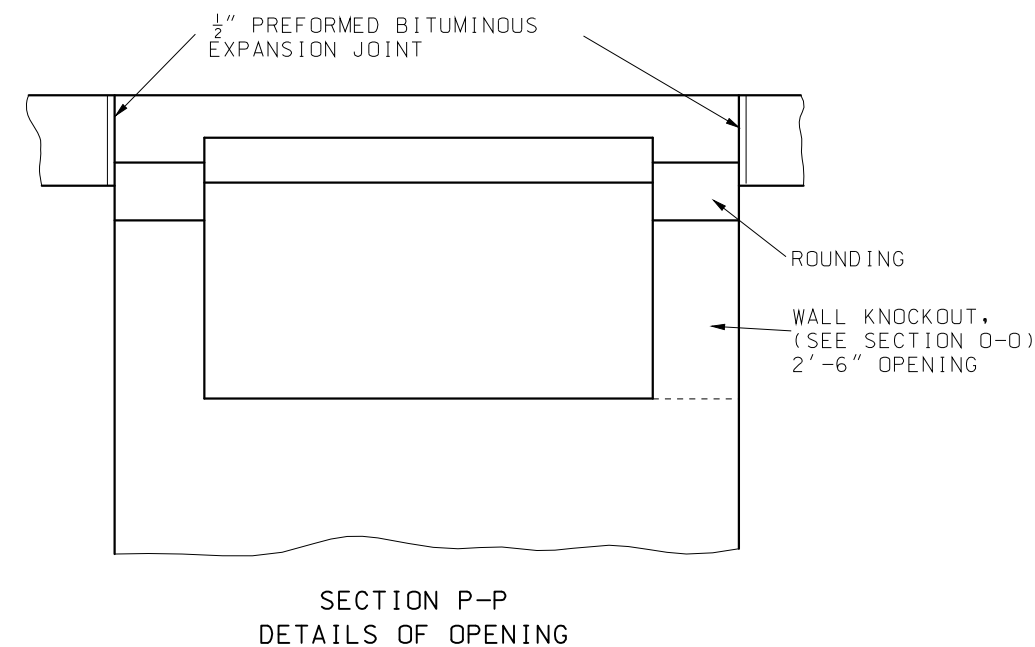
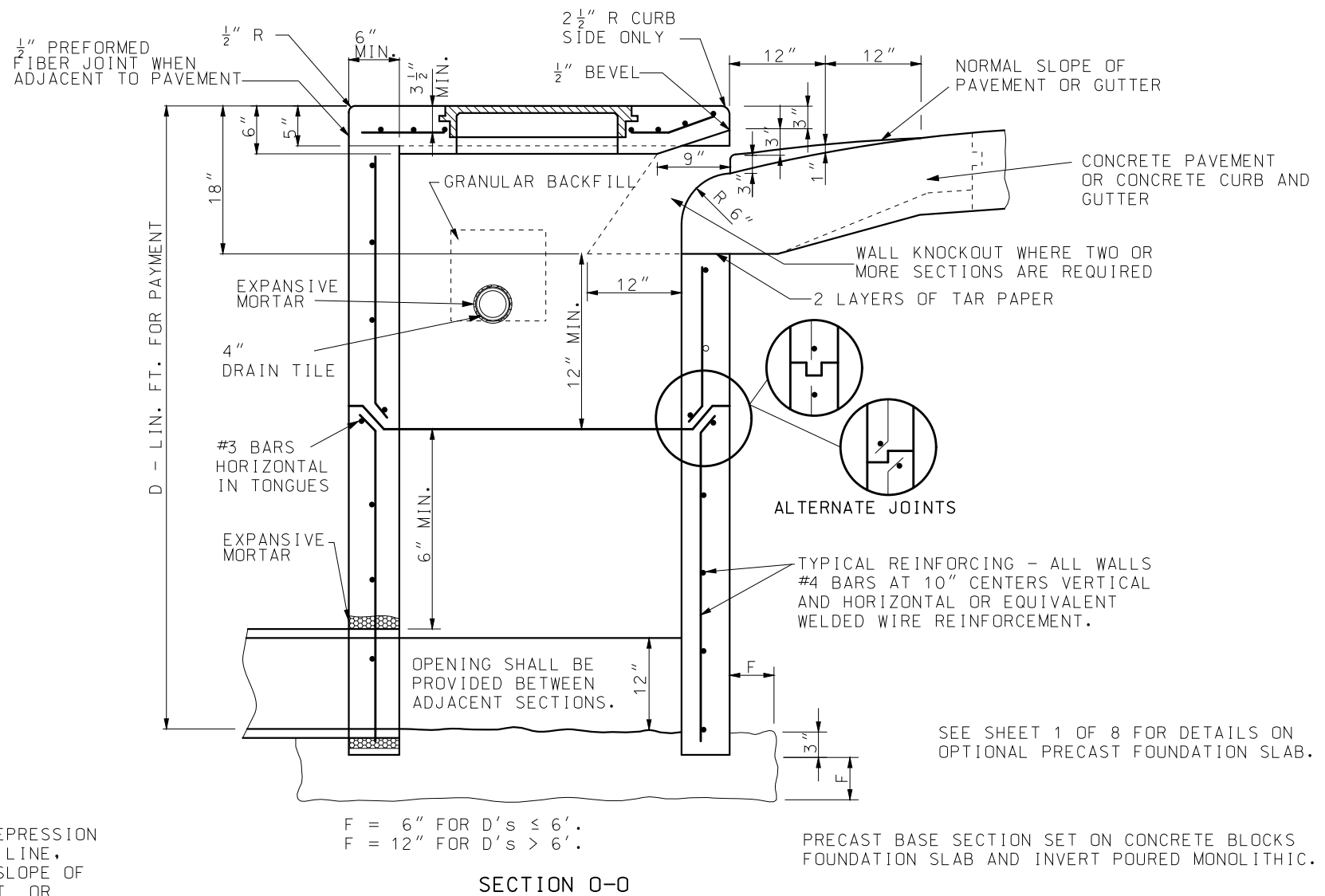
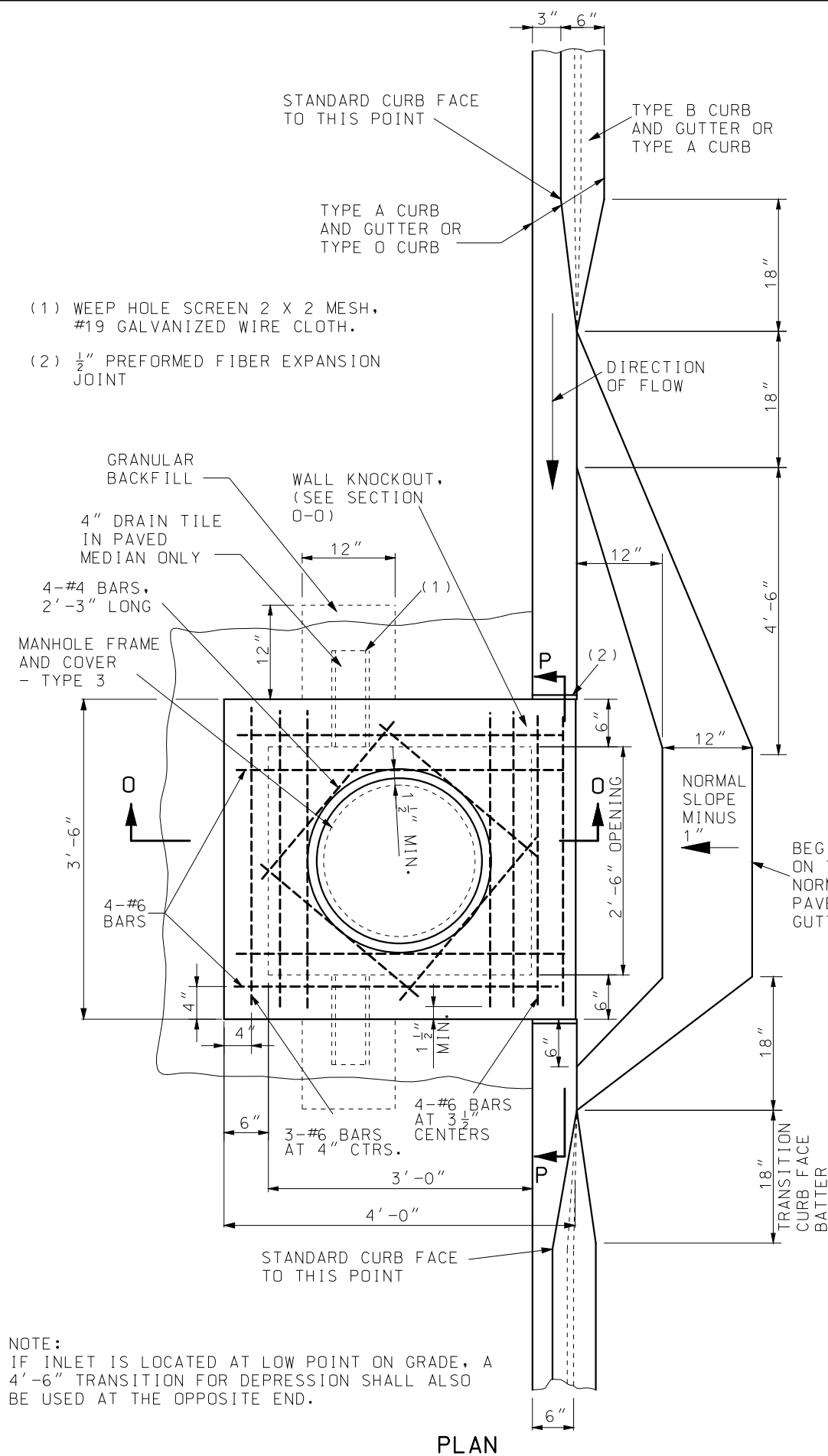
**PRECAST DROP INLET COVERS**



DATE EFFECTIVE: 07/01/2016
DATE PREPARED: 5/13/2016

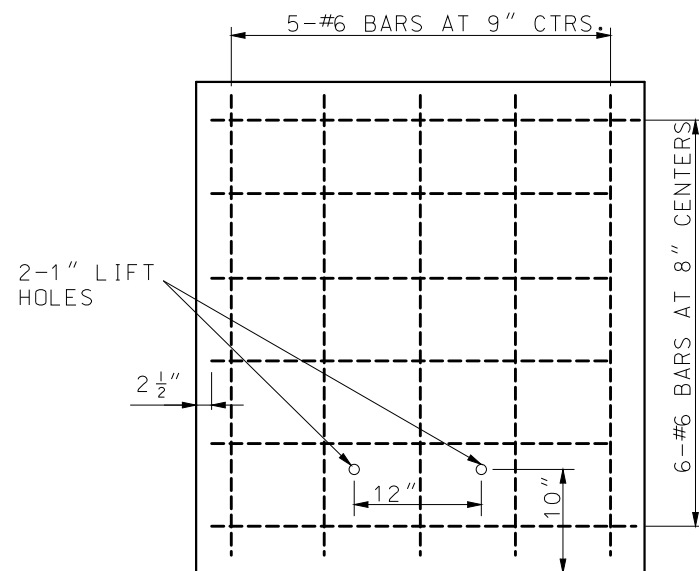
731.10S

SHEET NO.
4 OF 8

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

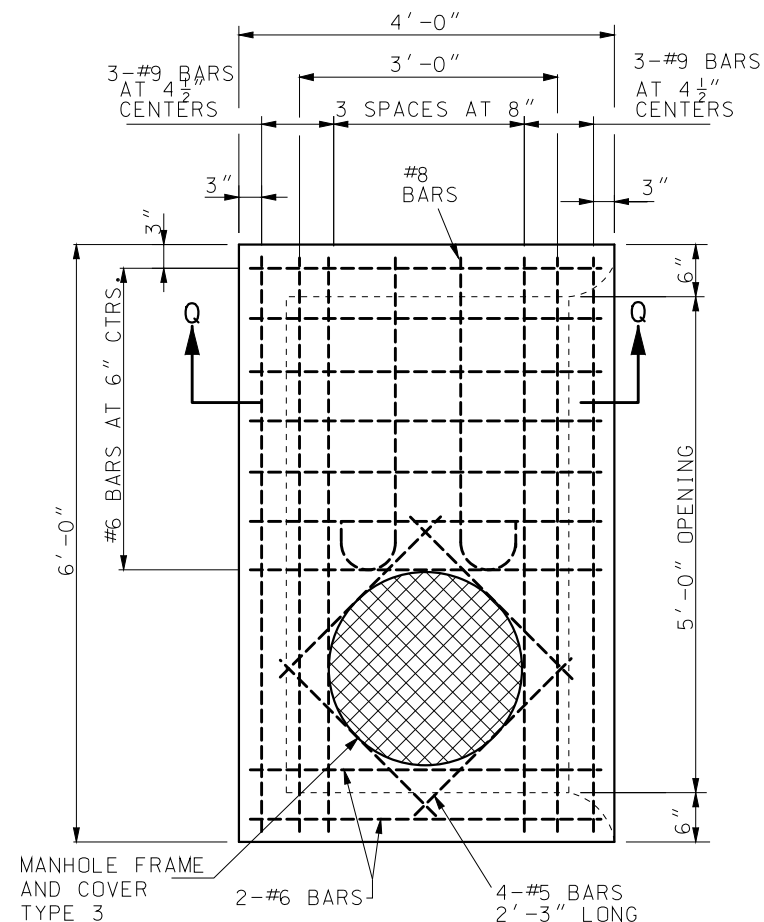


| | | | |
|---|----------------|--|----------------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | <p align="center">PRECAST DROP INLET CURB INLET - TYPE T</p> | |
| THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | | | |
| DATE EFFECTIVE: <u>07/01/2016</u> DATE PREPARED: <u>8/11/2016</u> | 731.10S | | SHEET NO. 5 OF 8 |

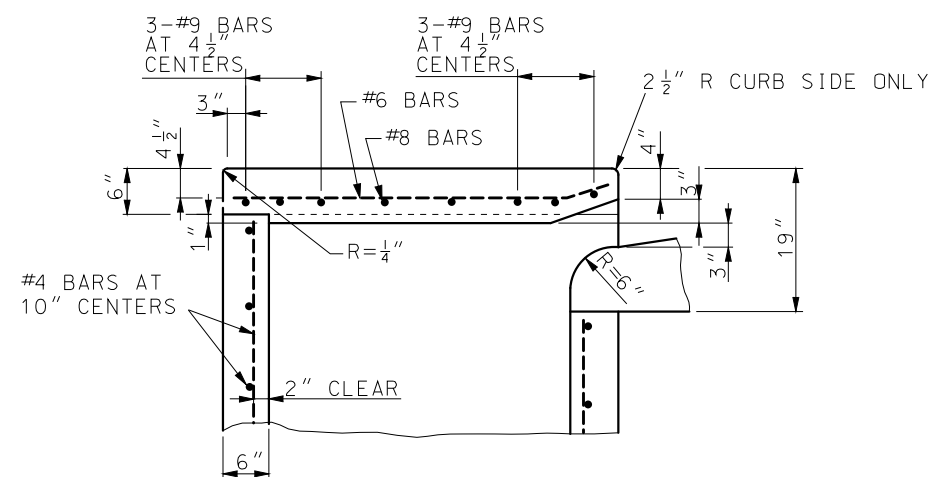


NOTE: REINFORCING FOR LIDS ON
UPSTREAM SECTIONS.

LID FOR ADJACENT SECTIONS



PLAN



SECTION Q-Q

OPTIONAL PRECAST CURB INLET 5'-0" OPENING

OTHER DETAILS ARE SAME AS
FOR THE 2'-6" OPENING
DROP INLET THIS SHEET.

GENERAL NOTES:

NOTES PERTAINING TO TYPE T:

THE LENGTH AND DEPTH OF THE INLET SHALL BE AS SHOWN
ON THE PLANS.


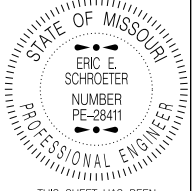
WALLS BETWEEN THE ADJACENT SECTIONS SHALL BE SEALED
IN ACCORDANCE WITH SECTION 726.3.1 OF THE STANDARD
SPECIFICATIONS.

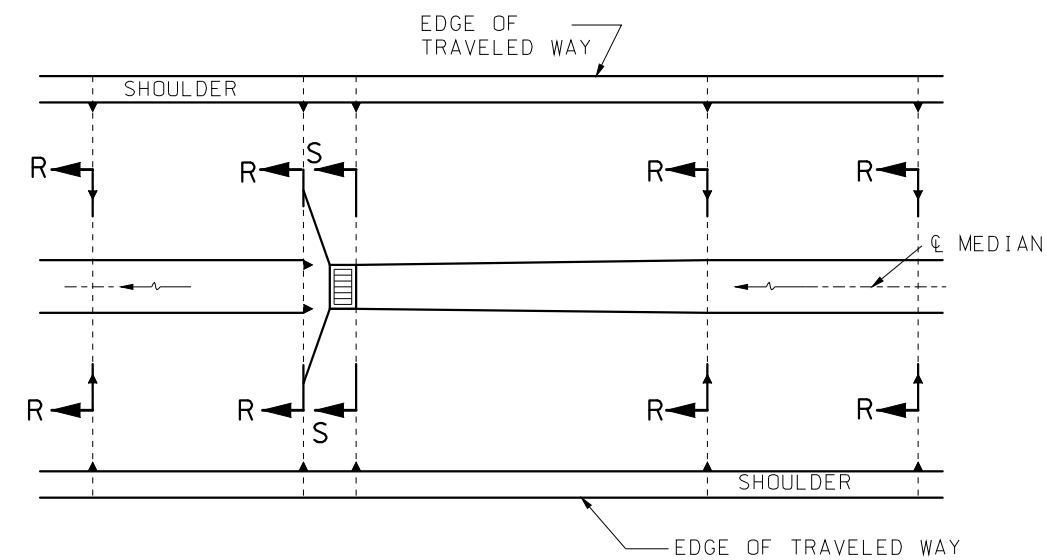
IF DEPTH OF INLET EXCEEDS 6 FEET THE PRECAST UNITS
MAY BE FURNISHED IN TWO OR MORE SECTIONS.

IF TWO OR MORE SECTIONS ARE USED, THE TYPE 3 MANHOLE
FRAME AND COVER SHALL BE IN THE DOWNSTREAM SECTION
ONLY.

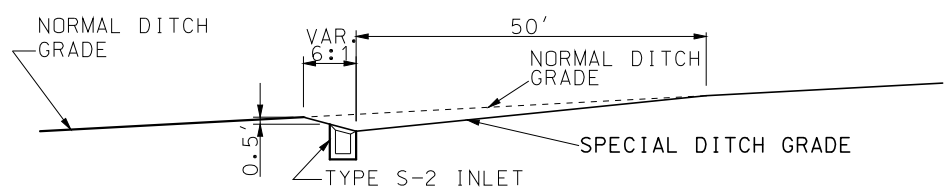
IF A 5 FOOT OPENING IS REQUIRED, TWO 2'-6" OPENING
SECTIONS OR ONE 5 FOOT OPENING SECTION MAY BE PROVIDED
AT THE CONTRACTOR'S OPTION.

SEE SHEET 1 FOR STEP DETAILS AND SHEET 4 FOR GENERAL
NOTES.

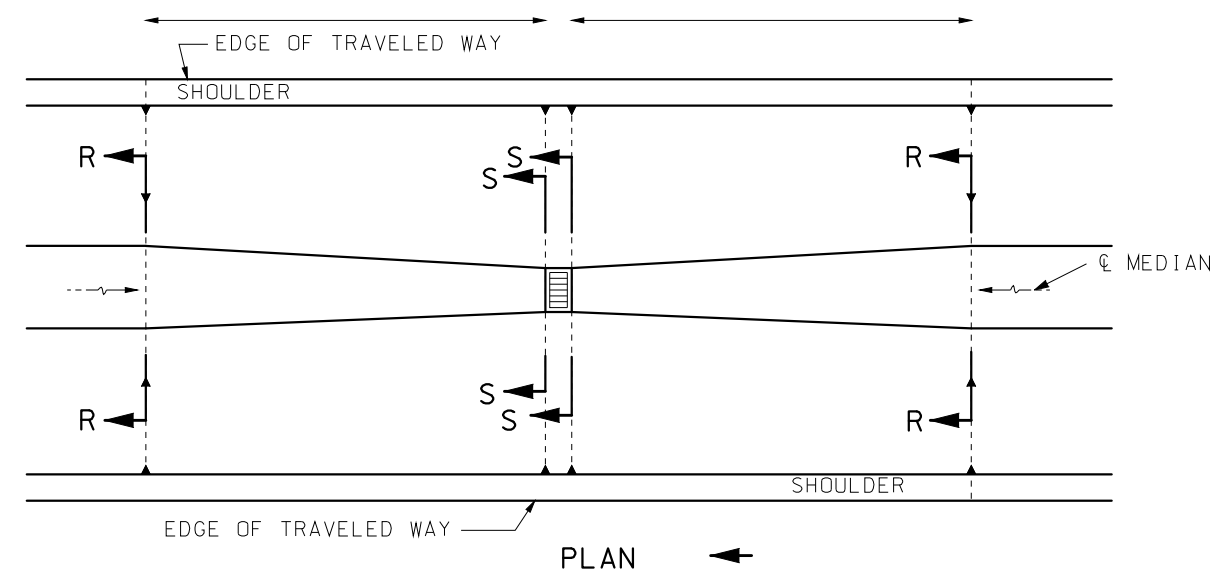
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|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PRECAST DROP INLET CURB INLET - TYPE T</p> |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 731.10S |
| SHEET NO. 6 OF 8 | |



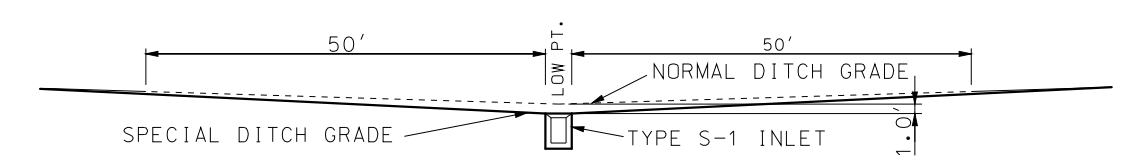
PLAN



SECTION ALONG CENTERLINE OF MEDIAN RELIEF ON GRADE

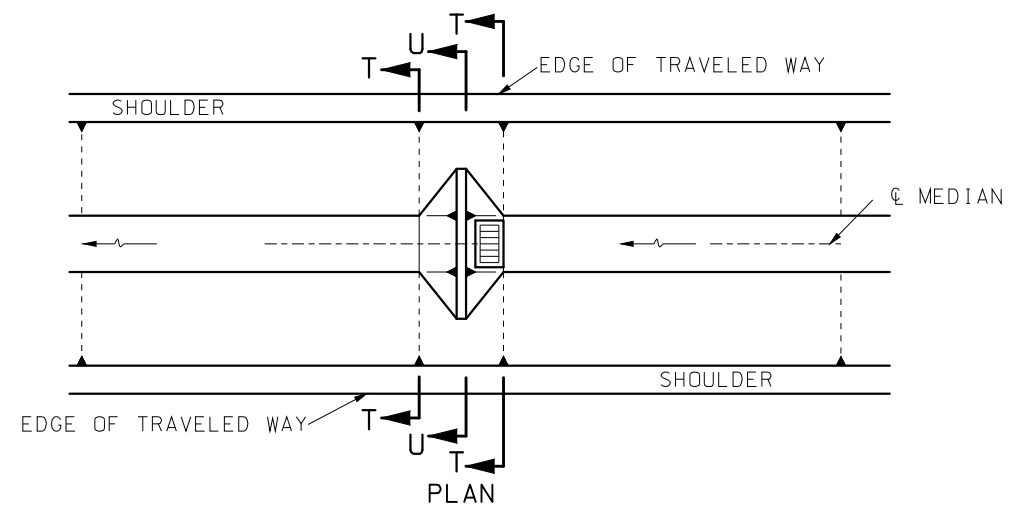


PLAN

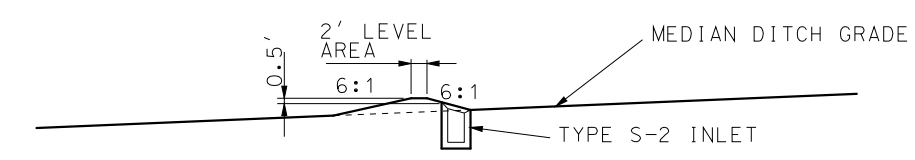


SECTION ALONG CENTERLINE OF MEDIAN RELIEF AT LOW POINT

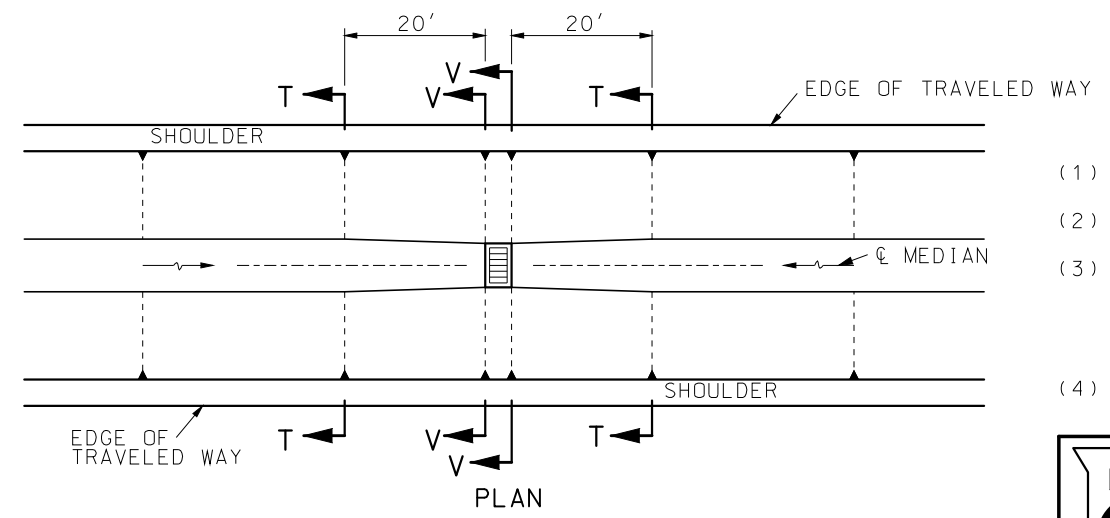
DETAILS FOR MEDIAN RELIEF-60' MEDIAN



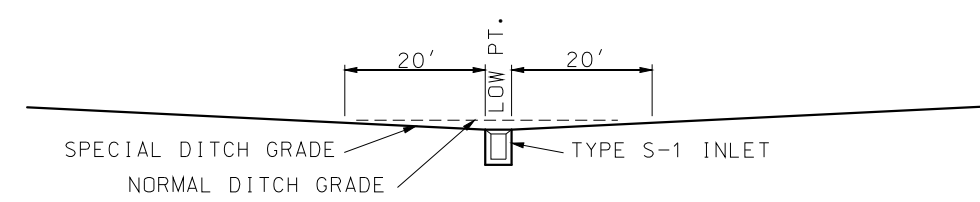
PLAN



SECTION ALONG CENTERLINE OF MEDIAN RELIEF ON GRADE

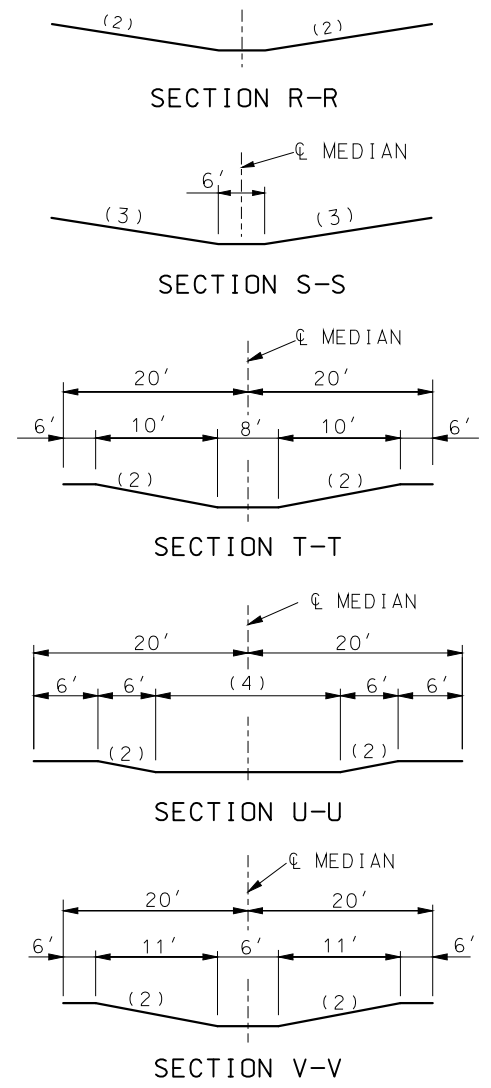


PLAN


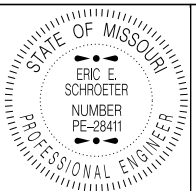


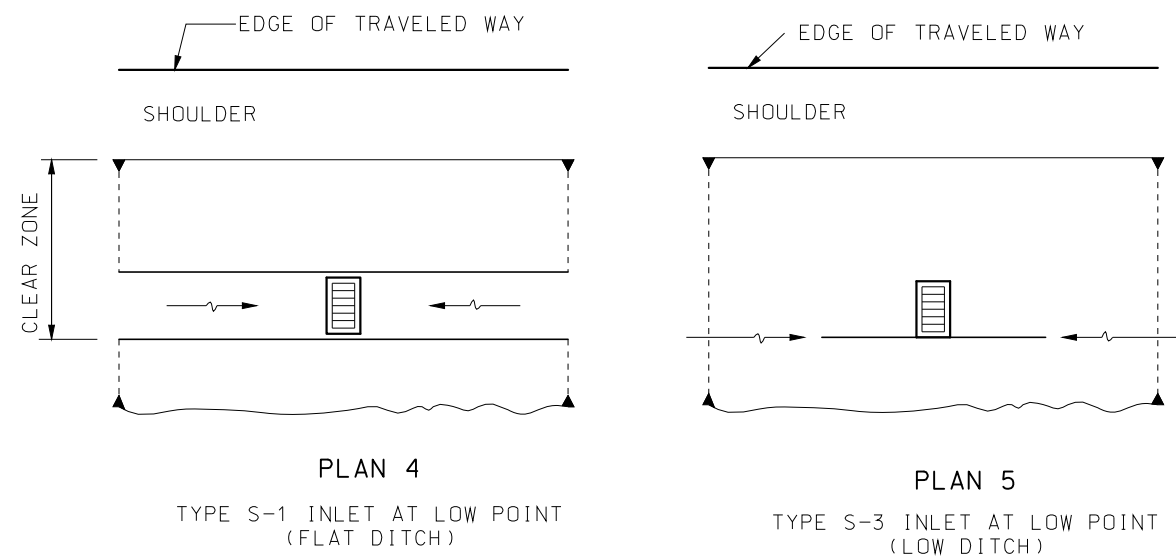
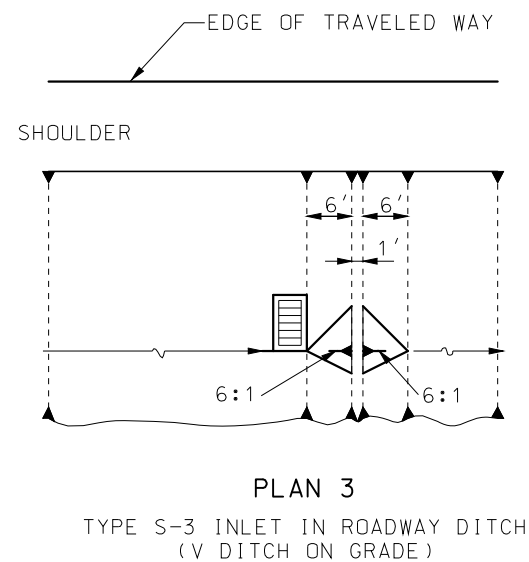
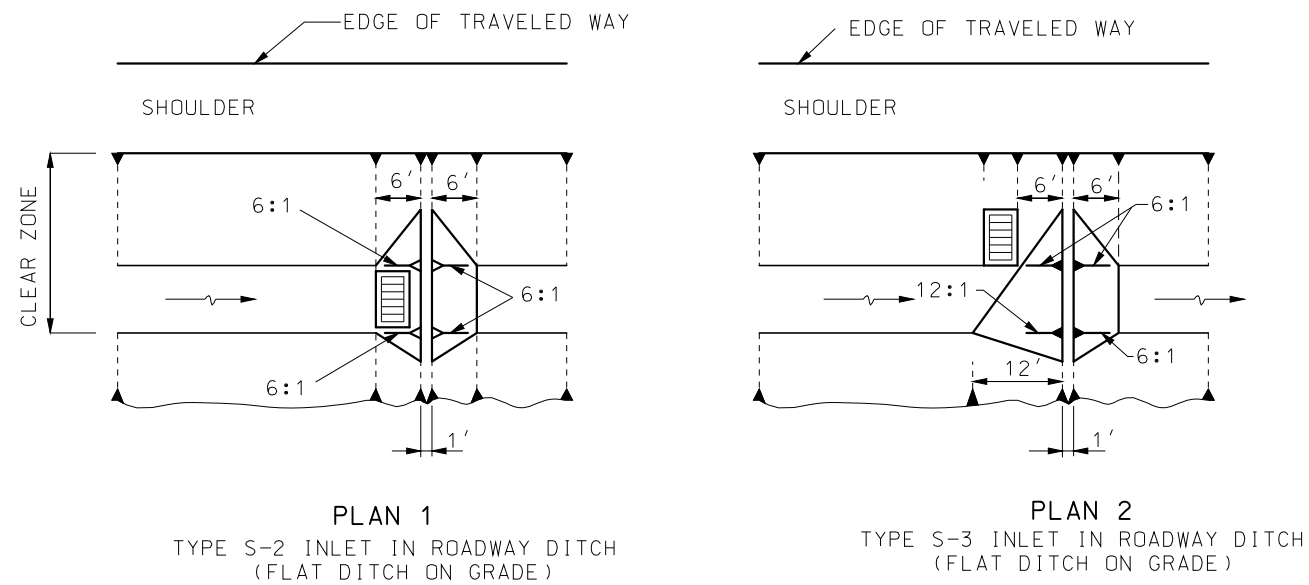
SECTION ALONG CENTERLINE OF MEDIAN RELIEF AT LOW POINT

DETAILS FOR MEDIAN RELIEF-40' MEDIAN



- (1) DITCH WIDTH AS GIVEN ON TYPICAL SECTION.
- (2) DITCH SLOPE AS GIVEN ON TYPICAL SECTION.
- (3) VARY SLOPE TO ACHIEVE MINIMUM 0.5 FT. FREEBOARD ABOVE TOP OF INLET GRATE ON GRADE, OR 1.0 FT. ADDITIONAL DITCH DEPTH BELOW NORMAL DITCH GRADE AT LOW POINT.
- (4) VARY WIDTH TO ACHIEVE MINIMUM .05 FEET FREEBOARD ABOVE TOP OF INLET GRATE.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | PRECAST DROP INLET TYPICAL LOCATION DETAILS - TYPE S |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | SHEET NO. 731.10S 7 OF 8 |


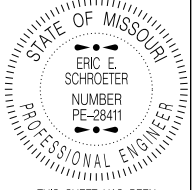


DETAILS FOR ROADWAY DITCH INLETS LOCATED WITHIN THE CLEAR ZONE

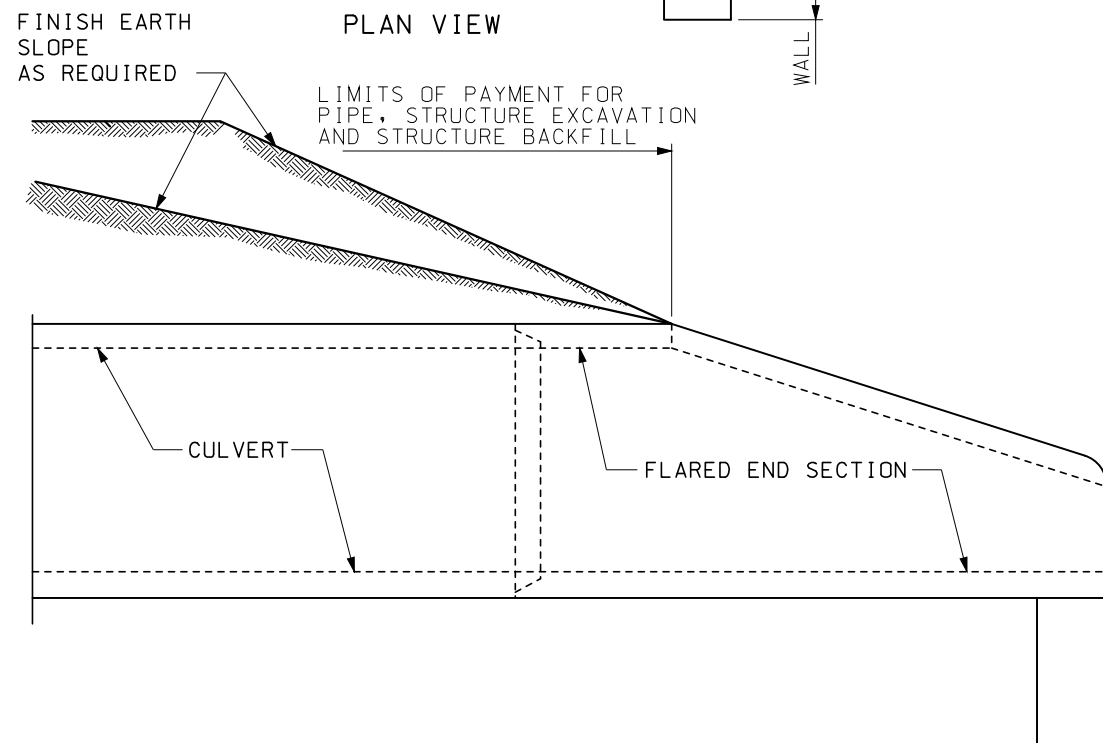
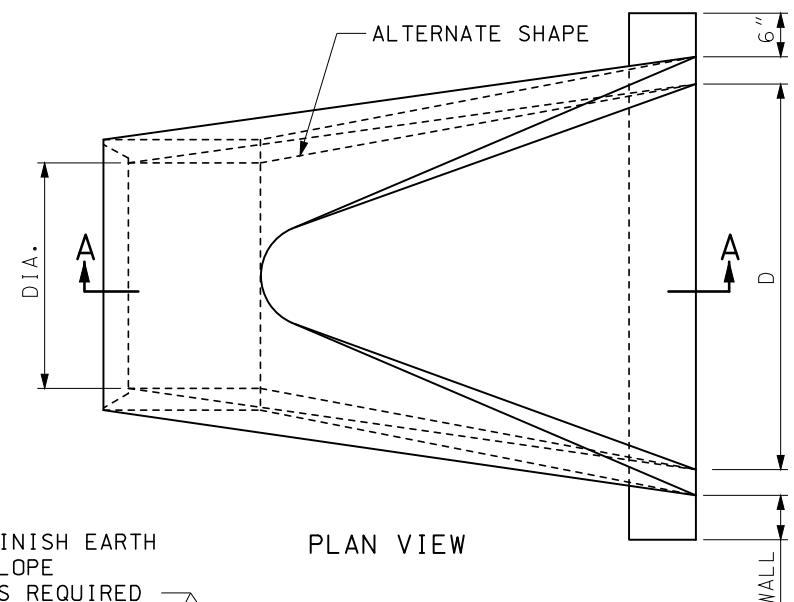
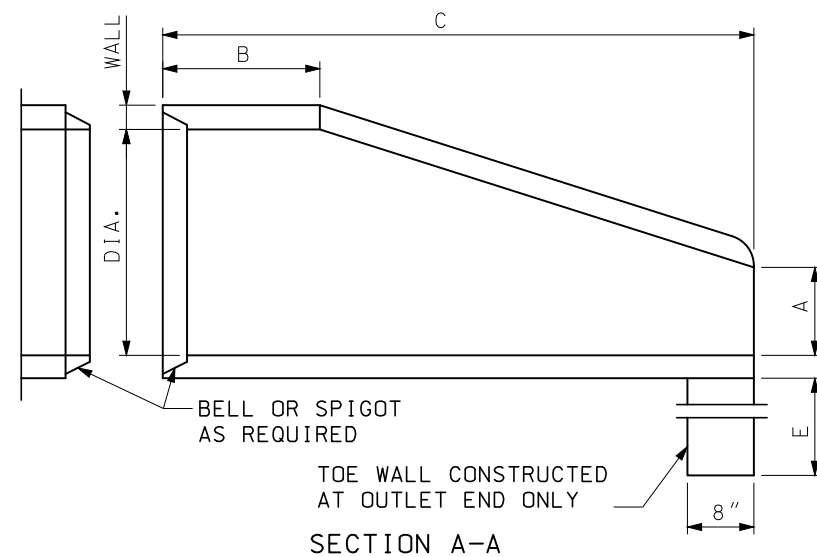
GENERAL NOTES:

THIS DRAWING IS FOR GENERAL INFORMATION ONLY. ACTUAL CONSTRUCTION DETAILS SHALL CONFORM TO THOSE SHOWN ON THE DETAIL PLANS.

DETAILS ON THIS SHEET ARE ONLY FOR USE WITH STRUCTURES LOCATED IN THE MEDIAN OR WITHIN THE CLEAR ZONE.

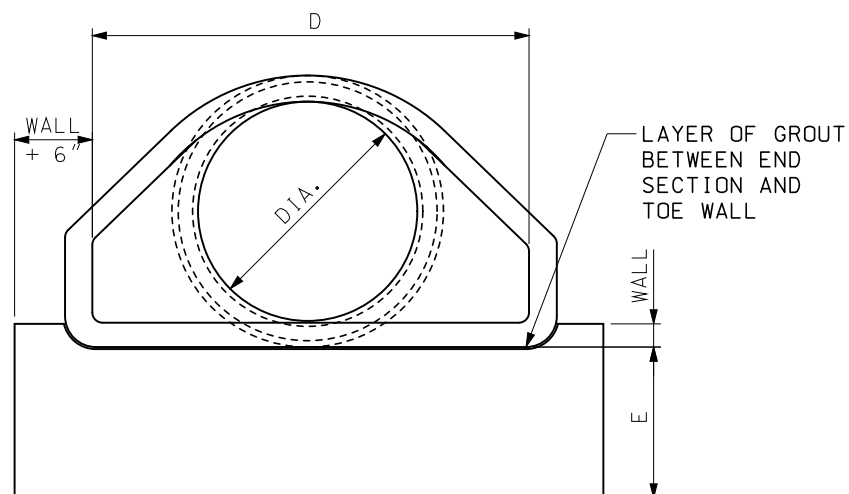
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|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PRECAST DROP INLET TYPICAL LOCATION DETAILS - TYPE S</p> |
| DATE EFFECTIVE: 07/01/2016 DATE PREPARED: 5/13/2016 | 731.10S |
| SHEET NO. 8 OF 8 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



INSTALLATION DETAILS

| DIMENSIONS | | | | | | |
|------------|--------|---------|-----------|-----------|--------|-----|
| DIA. | WALL | A | B MIN. | C MIN. | D | E |
| 12" | 2" | 4" | 4'-0" | 6' | 2'-0" | 18" |
| 15" | 2 1/4" | 6" | 3'-10" | 6' | 2'-6" | 18" |
| 18" | 2 1/2" | 9" | 3'-10" | 6' | 3'-0" | 18" |
| 21" | 2 3/4" | 9" | 3'-2" | 6' | 3'-6" | 18" |
| 24" | 3" | 9 1/2" | 2'-6" | 6' | 4'-0" | 24" |
| 27" | 3 1/4" | 10 1/2" | 2'-1" | 6' | 4'-6" | 24" |
| 30" | 3 1/2" | 1'-0" | 1'-7" | 6' | 5'-0" | 24" |
| 33" | 3 3/4" | 1'-2" | 1'-7" | 6' | 5'-6" | 24" |
| 36" | 4" | 1'-3" | 2'-10" | 8' | 6'-0" | 24" |
| 42" | 4 1/2" | 1'-9" | 2'-11" | 8' | 6'-6" | 24" |
| 48" | 5" | 2'-0" | 2'-2" | 8' | 7'-0" | 24" |
| 54" | 5 1/2" | 2'-3" | 2'-11" | 8' | 7'-6" | 36" |
| 60" | 6" | 2'-6" | 3'-3" | 8' | 8'-0" | 36" |
| 66" | 6 1/2" | 2'-0" | 1'-9" | 8' | 8'-6" | 36" |
| 72" | 7" | 2'-0" | 2'-9" | 10' | 9'-0" | 36" |
| 78" | 7 1/2" | 2'-3" | 2'-3" | 10' | 9'-6" | 36" |
| 84" | 8" | 2'-6" | 2'-0" | 10' | 10'-0" | 36" |



| REINFORCEMENT | | | | | |
|------------------------|---------------------------------------|---------------------------------------|---|---|---|
| ADJOINING PIPE DIA. | BARREL SECTION REINFORCEMENT | | FLARE SECTION REINFORCEMENT (ONE LAYER ONLY IN CENTER OF WALL) | | |
| | CIRCULAR | | ELLIPTICAL | | |
| | INNER CAGE SQ. IN./ LIN. FT. | OUTER CAGE SQ. IN./ LIN. FT. | SQ. IN./ LIN. FT. | AREA OF LONGITUDINAL SQ. IN./ LIN. FT. | AREA OF TRANSVERSE SQ. IN./ LIN. FT. |
| 12" | 0.07 | | | 0.048 | 0.048 |
| 15" | 0.07 | | | 0.054 | 0.054 |
| 18" | 0.07 | | 0.07 | 0.060 | 0.060 |
| 21" | 0.07 | | 0.07 | 0.066 | 0.066 |
| 24" | 0.07 | | 0.07 | 0.072 | 0.072 |
| 27" | 0.13 | | 0.11 | 0.078 | 0.078 |
| 30" | 0.14 | | 0.12 | 0.084 | 0.084 |
| 33" | 0.15 | | 0.13 | 0.090 | 0.090 |
| 36" | 0.12 | 0.09 | 0.13 | 0.096 | 0.096 |
| 42" | 0.15 | 0.12 | 0.17 | 0.108 | 0.108 |
| 48" | 0.18 | 0.14 | 0.20 | 0.120 | 0.120 |
| 54" | 0.22 | 0.16 | 0.24 | 0.132 | 0.132 |
| 60" | 0.25 | 0.19 | 0.28 | 0.144 | 0.144 |
| 66" | 0.31 | 0.23 | 0.34 | 0.156 | 0.156 |
| 72" | 0.35 | 0.21 | 0.39 | 0.170 | 0.170 |
| 78" | 0.40 | 0.24 | 0.44 | 0.185 | 0.185 |
| 84" | 0.46 | 0.28 | 0.51 | 0.205 | 0.205 |

GENERAL NOTES:

SLIGHT VARIATIONS IN BOTH SHAPE AND DIMENSIONS FROM THOSE SHOWN MAY BE ACCEPTED IF APPROVED BY THE ENGINEER.

NOT MORE THAN THREE LIFT HOLES MAY BE DRILLED OR CAST IN THE END SECTION FOR HANDLING AND LAYING.

LIFT LUGS OR BARS WILL BE PERMITTED IN PRECAST TOE WALLS.

TOE WALLS MAY BE CAST-IN-PLACE OR PRECAST.

STEEL FIBERS MAY BE USED IN LIEU OF REBAR OR COLD DRAWN STEEL WIRE AS PER SECTION 1032.3.4.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MDOT (1-888-275-6636)

FLARED END SECTION
PRECAST CONCRETE

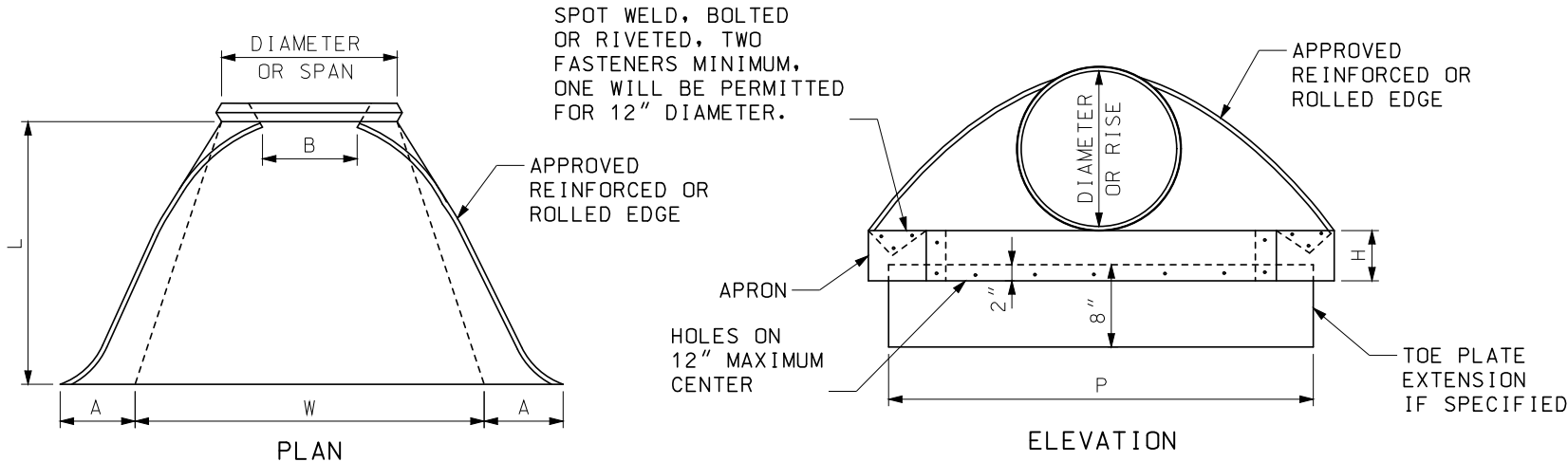
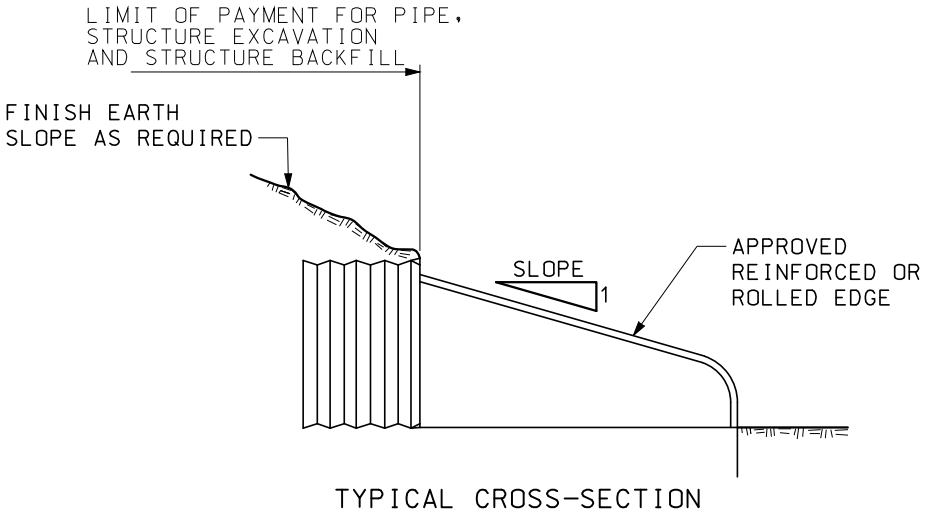
DATE EFFECTIVE: 04/01/2016
DATE PREPARED: 2/11/2016

732.00S

SHEET NO.
1 OF 3

| END SECTIONS FOR ARCH PIPE | | | | | | | | | | |
|----------------------------|-----------------------------------|---|-------------------------------------|------------------|-----------|--------------|------------------|--------------|--|---------------------------------------|
| TYPE | ARCH DIMENSIONS SPAN x RISE | DIAMETER EQUIVALENT ROUND PIPE IN. | GALVANIZED SHEET THICK IN. | DIMENSIONS (IN.) | | | | | APPROXIMATE SLOPE (V:H) (1:SLOPE) | TOE PLATE IF SPECIFIED P. (IN.) |
| | | | | A 1" TOL. | B MAX. | H 1" TOL. | L 1 1/2" TOL. | W 2" TOL. | | |
| B1 | SEE STANDARD PLAN 725.00 | 15 | .064 | 6 | 9 | 6 | 19 | 30 | 2 1/8 | 40 |
| B2 | | 18 | .064 | 7 | 11 | 6 | 23 | 36 | 2 | 46 |
| B3 | | 21 | .064 | 8 | 12 | 6 | 28 | 42 | 2 1/8 | 52 |
| B4 | | 24 | .064 | 8 | 16 | 6 | 32 | 48 | 2 | 58 |
| B5 | | 30 | .079 | 10 | 16 | 6 | 39 | 60 | 1 7/8 | 70 |
| B6 OR B6A | | 36 | .079 | 12 | 18 | 8 | 46 | 75 | 1 3/4 | 85 |
| B7 OR B7A | | 42 | .109 | 13 | 21 | 9 | 53 | 85 | 1 7/8 | 107 |
| B8 OR B8A | | 48 | .109 | 18 | 26 | 12 | 63 | 90 | 1 7/8 | 112 |
| B9 OR B9A | | 54 | .109 | 18 | 30 | 12 | 70 | 102 | 1 7/8 | 124 |
| B10 OR B10A | | 60 | .109 | 18 | 33 | 12 | 77 | 114 | 1 7/8 | 136 |
| B11 OR B11A | | 66 | .109 | 18 | 36 | 12 | 77 | 126 | 1 5/8 | 148 |
| B12 OR B12A | | 72 | .109 | 18 | 39 | 12 | 77 | 138 | 1 1/2 | 160 |

| END SECTIONS FOR ROUND PIPE | | | | | | | | |
|-----------------------------|---------------------------------------|------------------|-----------|--------------|------------------|--------------|--|---------------------------------------|
| PIPE DIAMETER (IN.) | GALVANIZED SHEET THICK (IN.) | DIMENSIONS (IN.) | | | | | APPROXIMATE SLOPE (V:H) (1:SLOPE) | TOE PLATE IF SPECIFIED P. (IN.) |
| | | A 1" TOL. | B MAX. | H 1" TOL. | L 1 1/2" TOL. | W 2" TOL. | | |
| 12 | .064 | 6 | 6 | 6 | 21 | 24 | 2 1/2 | 34 |
| 15 | .064 | 7 | 8 | 6 | 26 | 30 | 2 1/2 | 40 |
| 18 | .064 | 8 | 10 | 6 | 31 | 36 | 2 1/2 | 46 |
| 21 | .064 | 9 | 12 | 6 | 36 | 42 | 2 1/2 | 52 |
| 24 | .064 | 10 | 13 | 6 | 41 | 48 | 2 1/2 | 58 |
| 30 | .079 | 12 | 16 | 8 | 51 | 60 | 2 1/2 | 70 |
| 36 | .079 | 14 | 19 | 9 | 60 | 72 | 2 1/2 | 94 |
| 42 | .109 | 16 | 22 | 11 | 69 | 84 | 2 1/2 | 106 |
| 48 | .109 | 18 | 27 | 12 | 78 | 90 | 2 1/2 | 112 |
| 54 | .109 | 18 | 30 | 12 | 84 | 102 | 2 OR 2 1/4 | 124 |
| 60 | .109 | 18 | 33 | 12 | 87 | 114 | 1 3/4 OR 2 | 136 |
| 66 | .109 | 18 | 36 | 12 | 87 | 120 | 1 1/2 OR 2 | 144 |
| 72 | .109 | 18 | 39 | 12 | 87 | 126 | 1 1/3 OR 2 | 148 |
| 78 | .109 | 18 | 42 | 12 | 87 | 132 | 1 1/4 OR 1 1/2 | 154 |
| 84 | .109 | 18 | 45 | 12 | 87 | 138 | 1 1/6 OR 1 1/2 | 160 |



END SECTION FOR PIPE AND PIPE ARCH

GENERAL NOTES:

MINOR VARIATIONS OF DETAIL AND DIMENSIONS WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER’S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE 3/8" DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

TOE PLATE EXTENSIONS, IF SPECIFIED, SHALL HAVE HOLES TO MATCH HOLES IN TOE PLATE.

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" THROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

SKIRT SECTIONS FOR 30" AND LARGER PIPES AND B5 AND LARGER PIPE ARCHES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48" AND LARGER PIPES AND B8 OR LARGER PIPE ARCHES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

SKIRT SECTIONS FOR 72" AND LARGER PIPES MAY BE MADE FROM UP TO 4 SHEETS JOINED BY RIVETING AND BOLTING. THE BOTTOM PANEL SHALL BE 2 EQUAL WIDTH SHEETS JOINED ON CENTERLINE.

ALL 3 PIECE AND 4 PIECE SKIRTS FOR 60" OR LARGER PIPES AND B10 AND LARGER PIPE ARCHES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTIONS. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

SEE SHEET 3 OF 3 FOR CONNECTION DETAILS

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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FLARED END SECTION
METAL

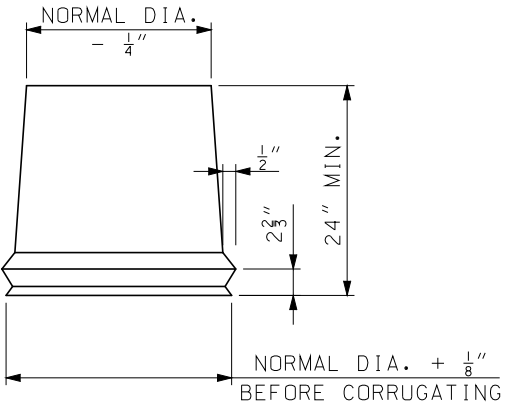
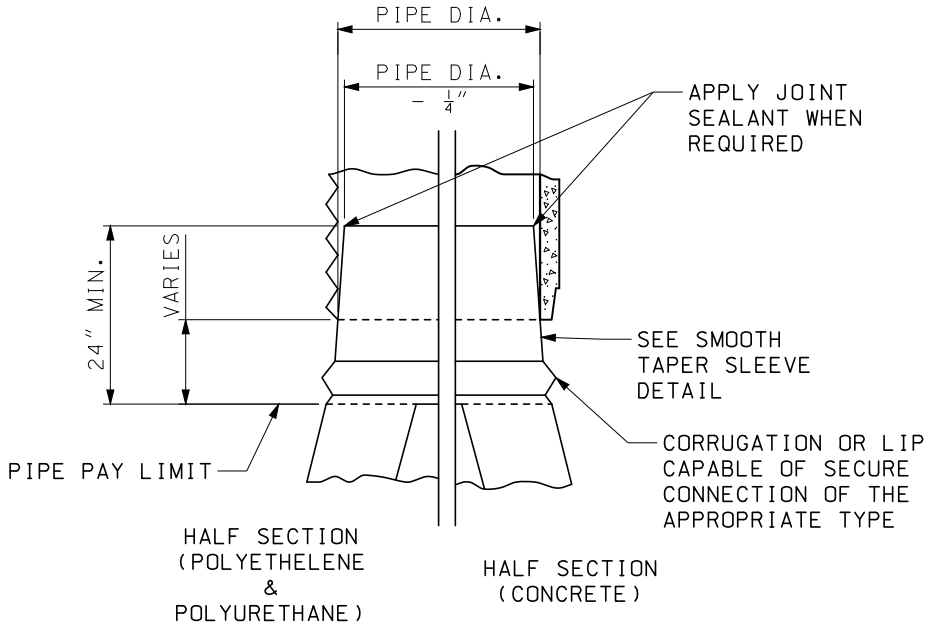
DATE EFFECTIVE: 04/01/2016
DATE PREPARED: 2/11/2016

732.00S

SHEET NO.
2 OF 3

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

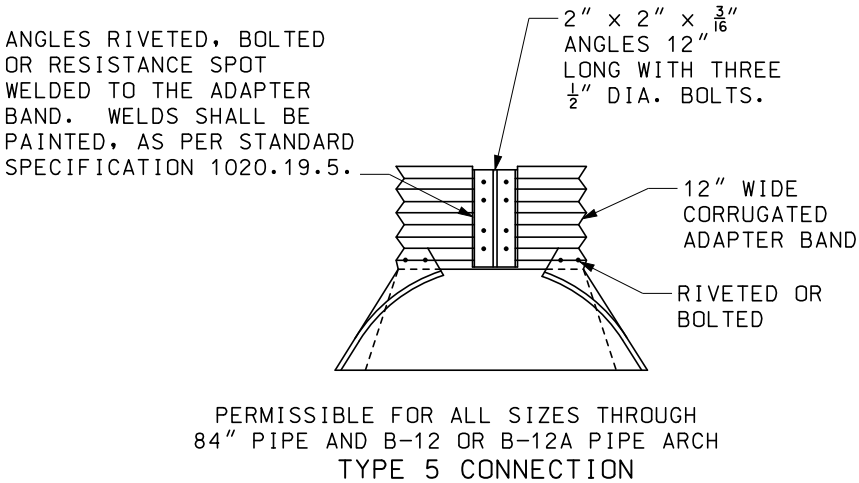
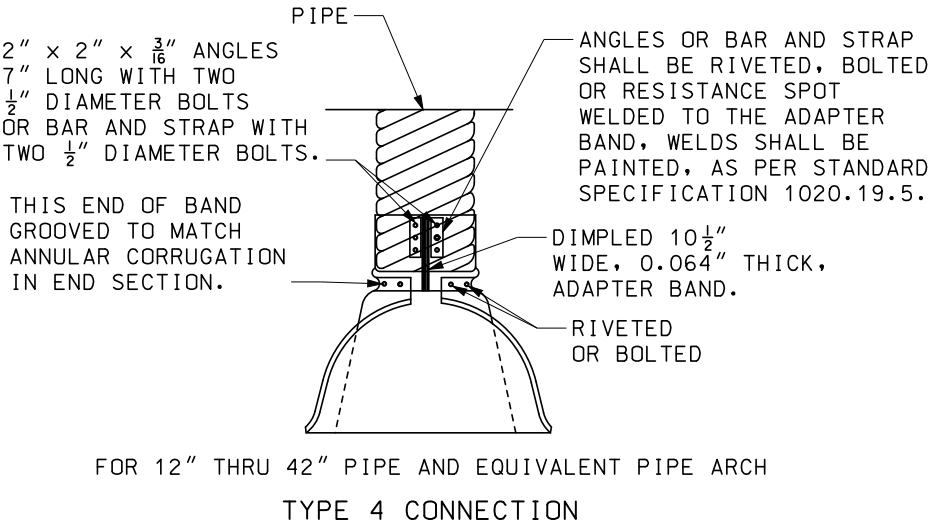
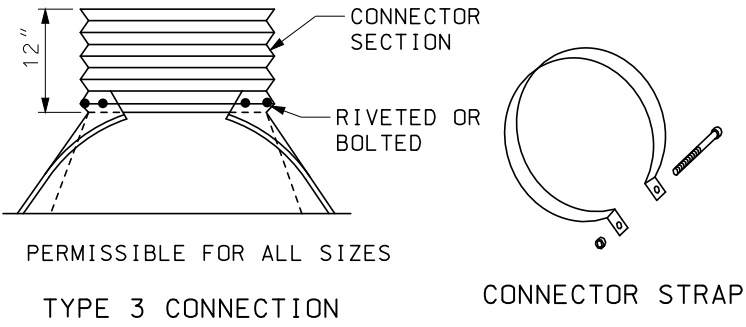
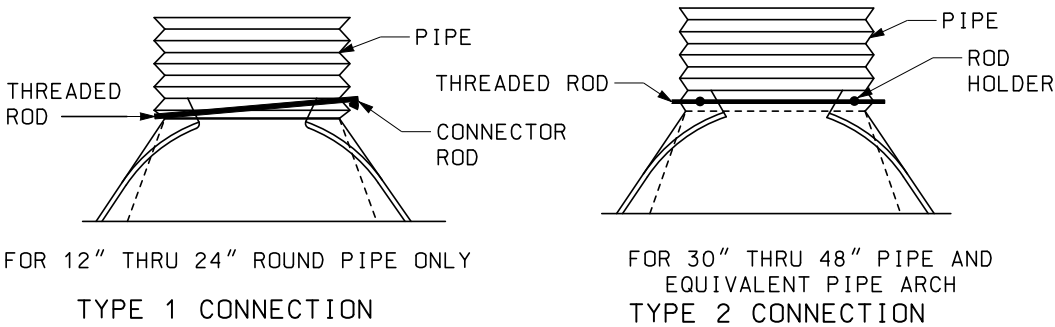
| CONNECTION REQUIREMENTS | | | | | |
|--------------------------|-----------------|----------------------------|----------------------------|---------|-------|
| TYPE | CONNECTION TYPE | ALLOWABLE SIZE RANGE (IN.) | TAPERED SLEEVE REQUIREMENT | | |
| | | | CMP | RCP PVC | PP PE |
| SAFETY END SECTION | 2 | ALL | N | Y | Y |
| | 6 | 12-24 | N | Y | Y |
| METAL FLARED END SECTION | 1 | 12-24 | N | Y | N |
| | 2 | ALL | N | Y | N |
| | 3 | ALL | N | Y | N |
| | 4 | 12-24 | N | Y | N |
| | 5 | 12-24 | N | Y | N |
| | 6 | 12-24 | N | Y | N |



FORM 1/2" X 2 3/4" CORRUGATIONS. MAINTAIN INSIDE DIAMETER OF SLEEVE. FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER. SMOOTH TAPERED SLEEVE DETAIL

TAPERED SLEEVE CONNECTION FOR CONCRETE AND THERMOPLASTIC PIPE

TAPERED SLEEVE SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.



GENERAL NOTES:

MINOR VARIATIONS OF DETAIL AND DIMENSIONS WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

TAPERED SLEEVES SHALL BE FABRICATED FROM SMOOTH 12 GAUGE STEEL COATED IN ACCORDANCE WITH AASHTO M-218.

TAPERED SLEEVES SHALL BE FIRMLY WEDGED INTO THE PIPE END BEFORE BACKFILLING PIPE PAY LENGTH.

THE LENGTH OF TAPERED SLEEVE SHALL BE SIZED TO PROTECT UV SENSITIVE PIPE MATERIALS FROM SUNLIGHT. THE ENTIRE COST OF THE TAPERED SLEEVE, HARDWARE, AND INSTALLATION SHALL BE INCLUDED IN THE COST OF THE PIPE.

TAPERED SLEEVES SHALL HAVE AT A MINIMUM A HALF CORRUGATION OR LIP DESIGNED TO PROVIDE A SECURE CONNECTION WITH THE END SECTION.

ANY ROD OR STRAP USED FOR MAKING A CONNECTION SHALL BE SECURLY SEATED INTO A VALLEY OF THE PIPE CORRUGATION. THE VALLEY CHOOSEN TO HOLD THE ROD OR STRAP SHALL LEAVE AT LEAST ONE FULL INTACT CORRUGATION BEFORE THE END OF THE PIPE. THE FEMALE PORTION OF A BELL END SHALL NOT COUNT AS A FULL INTACT CORRUGATION.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

FLARED END SECTION
METAL

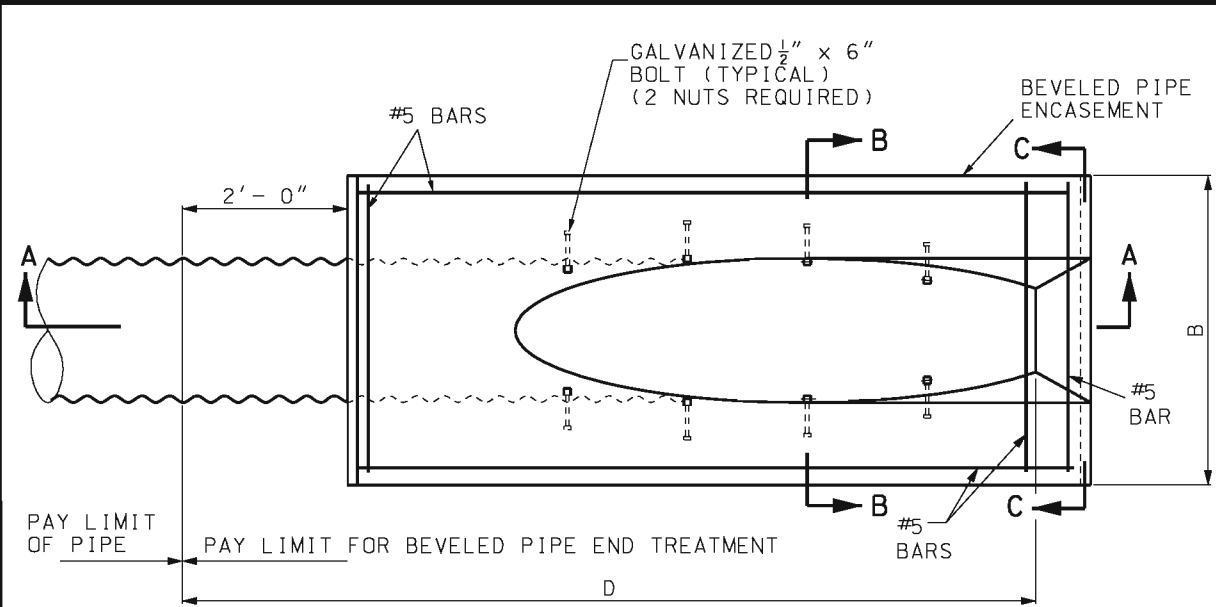
DATE EFFECTIVE: 04/01/2016
DATE PREPARED: 2/11/2016

732.00S

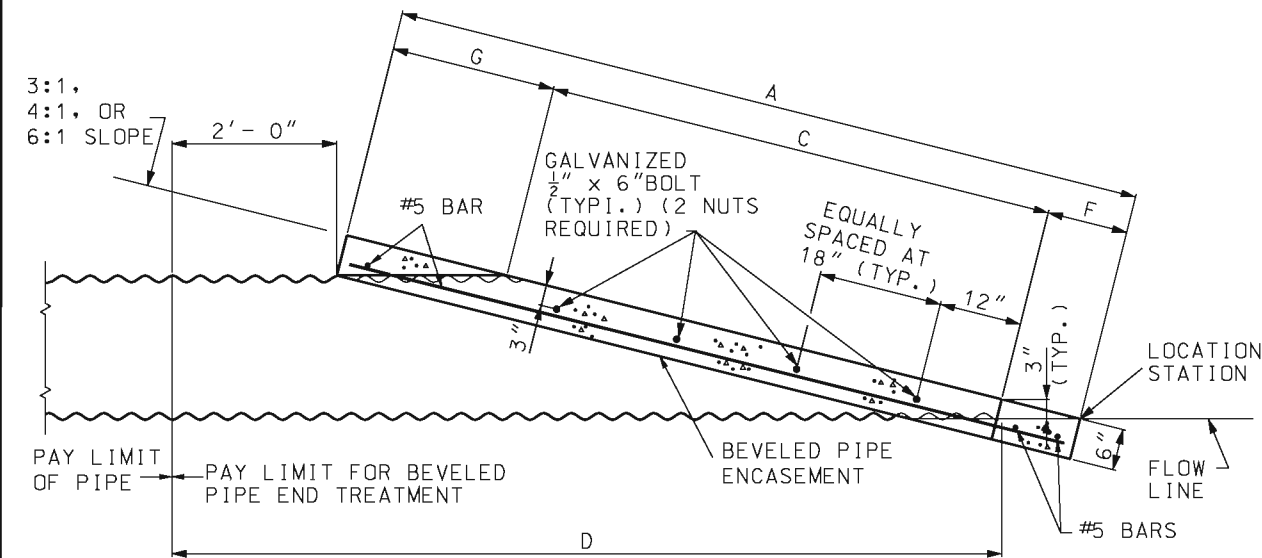
SHEET NO.
3 OF 3

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

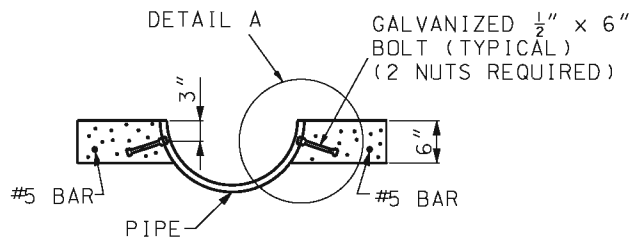
| BEVELED PIPE ENCASEMENT DETAILS | | | | | | | | |
|---------------------------------|-------|----------|-------|----------|---------|----|------|-----|
| PIPE DIAMETER | SLOPE | A | B | C | D | E | F | G |
| 15" | 3:1 | 5'-5½" | 3'-3" | 3'-2" | 6'-7" | 1 | 9½" | 18" |
| | 4:1 | 7'-2" | | 4'-1½" | 8'-1¼" | 2 | 12½" | 24" |
| | 6:1 | 10'-7¼" | | 6'-1" | 11'-1½" | 3 | 18¼" | 36" |
| 18" | 3:1 | 6'-3" | 3'-6" | 3'-11½" | 7'-4" | 2 | 9½" | 18" |
| | 4:1 | 8'-2¼" | | 5'-1¾" | 9'-1" | 3 | 12½" | 24" |
| | 6:1 | 12'-1½" | | 7'-7¼" | 12'-7½" | 4 | 18¼" | 36" |
| 21" | 3:1 | 7'-½" | 3'-9" | 4'-9" | 8'-1" | 3 | 9½" | 18" |
| | 4:1 | 9'-2¾" | | 6'-2¼" | 10'-1¼" | 3 | 12½" | 24" |
| | 6:1 | 13'-7¾" | | 9'-1½" | 14'-1½" | 5 | 18¼" | 36" |
| 24" | 3:1 | 7'-10" | 4'-0" | 5'-6½" | 8'-10" | 3 | 9½" | 18" |
| | 4:1 | 10'-3" | | 7'-2½" | 11'-1" | 4 | 12½" | 24" |
| | 6:1 | 15'-2" | | 10'-7¾" | 15'-7½" | 6 | 18¼" | 36" |
| 27" | 3:1 | 8'-7½" | 4'-3" | 6'-4" | 9'-7" | 4 | 9½" | 18" |
| | 4:1 | 11'-3½" | | 8'-3" | 12'-1¼" | 5 | 12½" | 24" |
| | 6:1 | 16'-8¼" | | 12'-2" | 17'-1½" | 7 | 18¼" | 36" |
| 30" | 3:1 | 9'-5" | 4'-6" | 7'-1½" | 10'-4" | 4 | 9½" | 18" |
| | 4:1 | 12'-3¾" | | 9'-3¼" | 13'-1" | 6 | 12½" | 24" |
| | 6:1 | 18'-2½" | | 13'-8¼" | 18'-7½" | 8 | 18¼" | 36" |
| 33" | 3:1 | 10'-2¼" | 4'-9" | 7'-10¾" | 11'-¾" | 5 | 9½" | 18" |
| | 4:1 | 13'-4¼" | | 10'-3¾" | 14'-1¼" | 6 | 12½" | 24" |
| | 6:1 | 19'-8¾" | | 15'-2½" | 20'-1½" | 9 | 18¼" | 36" |
| 36" | 3:1 | 10'-11¾" | 5'-0" | 8'-8¼" | 11'-10" | 5 | 9½" | 18" |
| | 4:1 | 14'-4½" | | 11'-4" | 15'-1" | 7 | 12½" | 24" |
| | 6:1 | 21'-3" | | 16'-8¾" | 21'-7½" | 10 | 18¼" | 36" |
| 42" | 3:1 | 12'-6¾" | 5'-6" | 10'-3¼" | 13'-4" | 6 | 9½" | 18" |
| | 4:1 | 16'-5¼" | | 13'-4¾" | 17'-1¼" | 8 | 12½" | 24" |
| | 6:1 | 24'-3½" | | 19'-9¼" | 24'-7½" | 13 | 18¼" | 36" |
| 48" | 3:1 | 14'-1¾" | 6'-0" | 11'-10¼" | 14'-10" | 7 | 9½" | 18" |
| | 4:1 | 18'-6" | | 15'-5½" | 19'-1¼" | 10 | 12½" | 24" |
| | 6:1 | 27'-4" | | 22'-9¾" | 27'-7½" | 15 | 18¼" | 36" |
| 54" | 3:1 | 15'-8¾" | 6'-6" | 13'-5¼" | 16'-4" | 8 | 9½" | 18" |
| | 4:1 | 20'-6¾" | | 17'-6¼" | 21'-1¼" | 11 | 12½" | 24" |
| | 6:1 | 30'-4½" | | 25'-10¼" | 30'-7½" | 17 | 18¼" | 36" |
| 60" | 3:1 | 17'-3¾" | 7'-0" | 15'-¾" | 17'-10" | 9 | 9½" | 18" |
| | 4:1 | 22'-7½" | | 19'-7" | 23'-1¼" | 12 | 12½" | 24" |
| | 6:1 | 33'-5" | | 28'-10¾" | 33'-7½" | 19 | 18¼" | 36" |



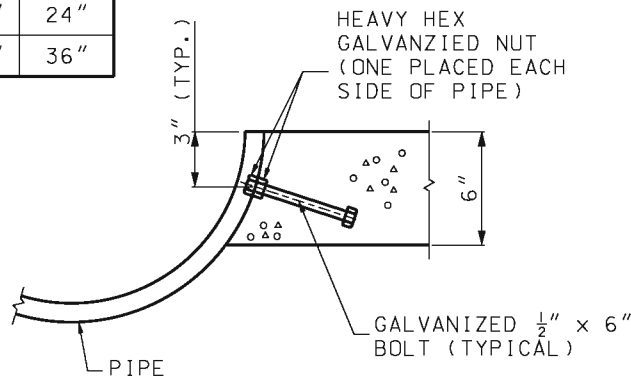
PLAN VIEW FOR HIGHWAYS



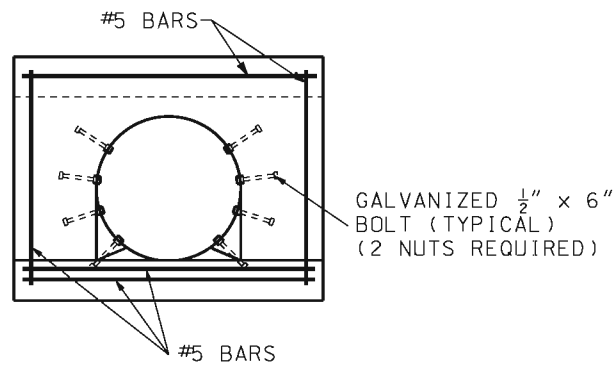
SECTION A-A



SECTION B-B



DETAIL A



SECTION C-C

GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.


REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.


THE ½" x 6" BOLT AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 (ASTM A153) SPECIFICATIONS. LOW CARBON STEEL ANCHOR BOLTS SHALL MEET ASTM A307.

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF ½" x 6" GALVANIZED BOLTS. THE ½" x 6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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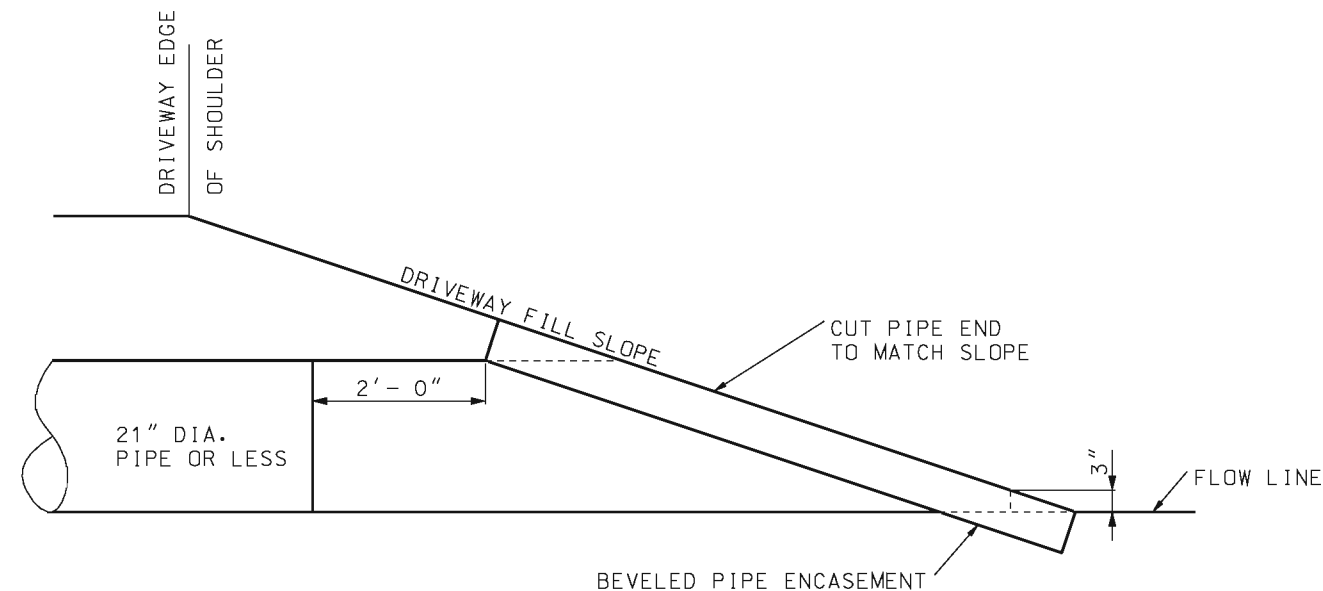
BEVELED PIPE END TREATMENT FOR HIGHWAYS

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 07/01/2004
DATE PREPARED: 12/16/2008

732.05C

SHEET NO.
1 OF 2



PIPE END DETAILS FOR PARALLEL DRAINAGE STRUCTURES FOR DRIVEWAYS
(SINGLE PIPE INSTALLATION)

NOTE:

FOR MULTIPLE PIPE INSTALLATIONS, END SECTIONS WITH SAFETY BARS SYSTEM OR OPTIONAL BAR GATE SYSTEM SHALL BE PROVIDED. SEE STANDARD PLAN 732.10.

SEE DRIVEWAY STANDARD PLANS FOR BEVELED END SECTION REQUIREMENTS.

GENERAL NOTES:

CONCRETE USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL BE CLASS B CONCRETE OR AN APPROVED COMMERCIAL MIX MEETING REQUIREMENTS OF SECTION 501 OF THE STANDARD SPECIFICATIONS.


REINFORCING STEEL USED IN CONSTRUCTION OF THE BEVELED PIPE ENCASEMENT SHALL MEET THE REQUIREMENTS OF SECTION 1036 OF THE STANDARD SPECIFICATIONS.

BEVELED PIPE ENCASEMENT MAY BE USED WITH EITHER POLYETHYLENE OR CORRUGATED METALLIC COATED STEEL PIPE.

THE PRICE BID PER EACH FOR "BEVELED PIPE END TREATMENT" SHALL BE CONSIDERED FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND INSTALLATION OF THE BEVELED PIPE SECTION AND BEVELED PIPE ENCASEMENT AS SHOWN OR AS DIRECTED BY THE ENGINEER.

THE 1/2" x 6" BOLT AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 (ASTM A123) SPECIFICATIONS. LOW CARBON STEEL ANCHOR BOLTS SHALL MET ASTM A307.

BEVELED PIPE SHALL BE DRILLED AT LOCATIONS SHOWN ON PLANS FOR PLACEMENT OF 1/2" x 6" GALVANIZED BOLTS. THE 1/2" x 6" GALVANIZED BOLTS SHALL BE "DOUBLE NUTTED" AS SHOWN AND PLACED IN THE VALLEY OF PIPE CORRUGATIONS.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

KATHRYN PHILLIPS HARVEY

NUMBER PE-23751

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

BEVELED PIPE END TREATMENT FOR DRIVEWAYS

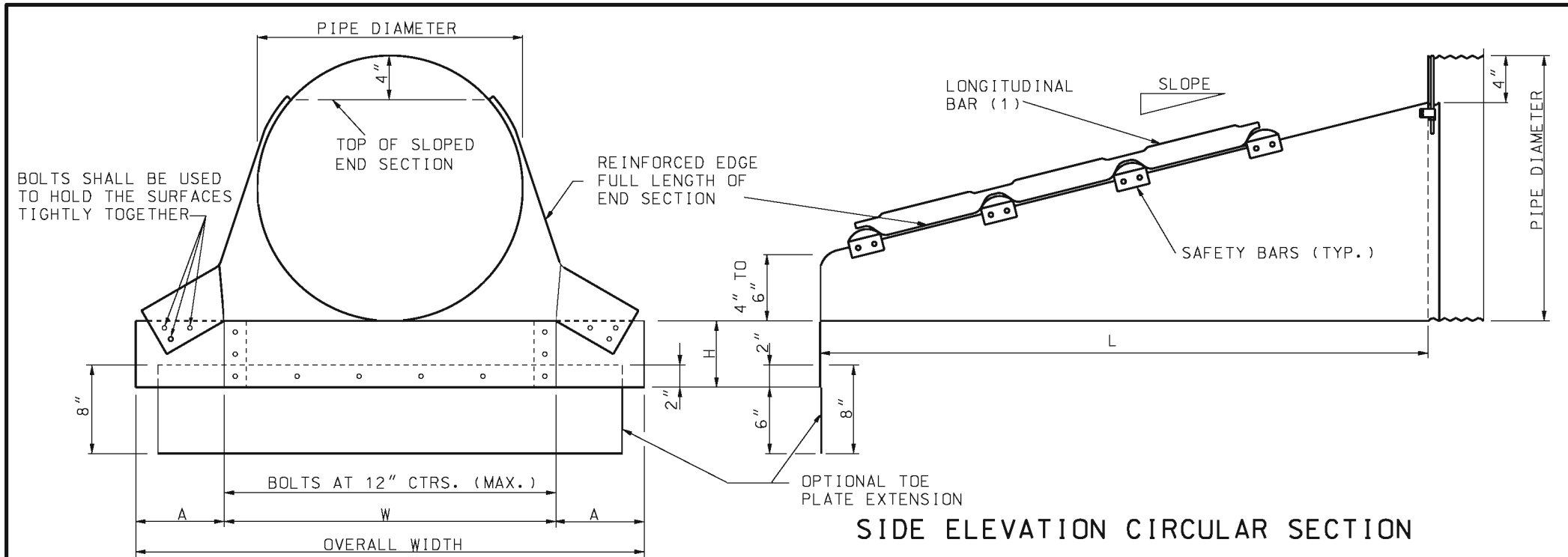
DATE EFFECTIVE: 07/01/2004

DATE PREPARED: 12/16/2008

732.05C

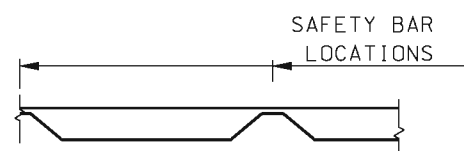
SHEET NO. 2 OF 2

IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

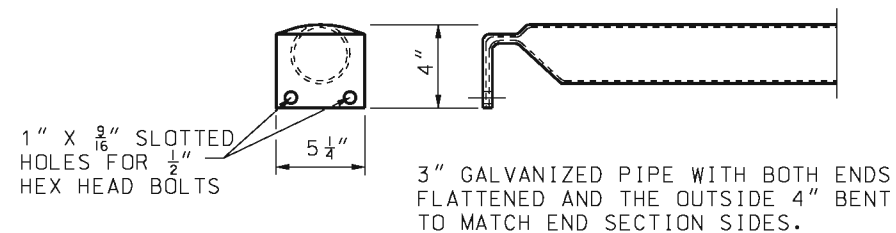


FRONT VIEW CIRCULAR PIPE

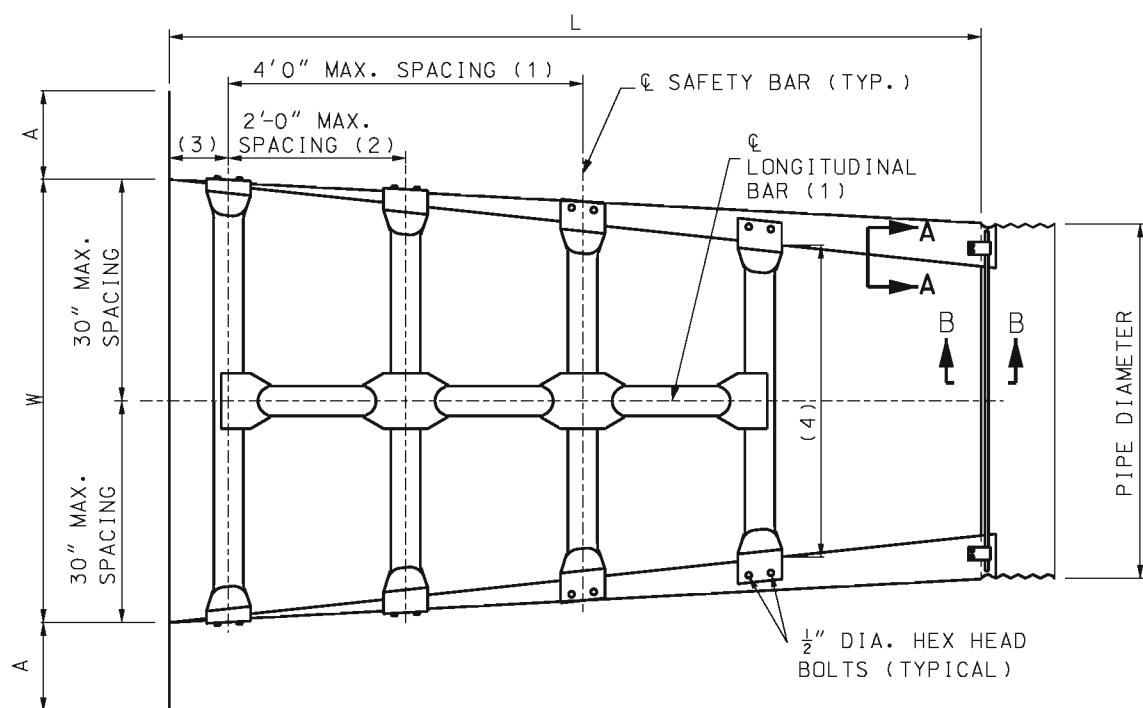
SIDE ELEVATION CIRCULAR SECTION



LONGITUDINAL BAR DETAIL



DETAIL OF SAFETY BAR



TOP VIEW CIRCULAR SECTION

LONGITUDINAL BAR, WHEN REQUIRED, SHALL BE WELDED TO SAFETY BARS TO FORM SINGLE GRATE STRUCTURE. LONGITUDINAL BAR IS NOT TO BE USED FOR PARALLEL DRAINAGE STRUCTURES.

NOTES:

- (1) FOR CROSSROAD DRAINAGE STRUCTURES ONLY.
- (2) FOR PARALLEL DRAINAGE STRUCTURES ONLY.
- (3) 4" TO 6" MINIMUM
- (4) SAFETY BARS SHALL BE PROVIDED UNTIL THE LATERAL SPAN OF THE OPENING IS LESS THAN OR EQUAL TO 30".

GENERAL NOTES:

END SECTIONS, INCLUDING ALL BOLTS, NUTS, RODS AND STRAPS, SHALL BE FABRICATED FROM GALVANIZED STEEL MEETING THE REQUIREMENTS OF SECTION 1020.

ALL BOLTS UNLESS OTHERWISE SHOWN SHALL BE A307 BOLTS.

WHEN REQUIRED, OPTIONAL TOE PLATE EXTENSION SHALL BE PUNCHED OR DRILLED AND BOLTED TO END SECTION TOE PLATE. STEEL FOR TOE PLATE EXTENSION SHALL BE SAME GAUGE AS END SECTION. DIMENSIONS SHALL BE OVERALL WIDTH LESS 6' BY 8" HIGH.

ATTACHMENT TO CIRCULAR PIPES 15" THROUGH 24" DIAMETER SHALL BE MADE WITH TYPE #1 STRAPS. ALL OTHER SIZES SHALL BE ATTACHED WITH TYPE #2 CONNECTORS.

SAFETY BARS AND LONGITUDINAL BARS SHALL BE FABRICATED FROM STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A-53 SCHEDULE 40 SPECIFICATIONS. SAFETY BARS AND LONGITUDINAL BARS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1020 OF STANDARD SPECIFICATIONS.

INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 725 AND 732 OF THE STANDARD SPECIFICATIONS.

SLOTTED HOLES FOR SAFETY BAR ATTACHMENT SHALL BE PROVIDED FOR ALL END SECTIONS.

MINOR VARIATIONS OF DETAIL WILL BE ACCEPTED TO PERMIT THE USE OF A MANUFACTURER'S STANDARD METHODS OF FABRICATION.

END SECTIONS FABRICATED FROM THICKER METAL THAN INDICATED WILL BE ACCEPTED.

ALL BOLTS SHALL BE $\frac{3}{8}$ " DIAMETER AND GALVANIZED, UNLESS OTHERWISE SHOWN.

SKIRT SECTION IS DEFINED AS THE FLARED PORTION OF THE END SECTION INCLUDING SIDE AND BOTTOM (CENTER) PANELS AND APRON.

SKIRT SECTION FOR 12" TROUGH 24" PIPES SHALL BE MADE IN ONE PIECE.

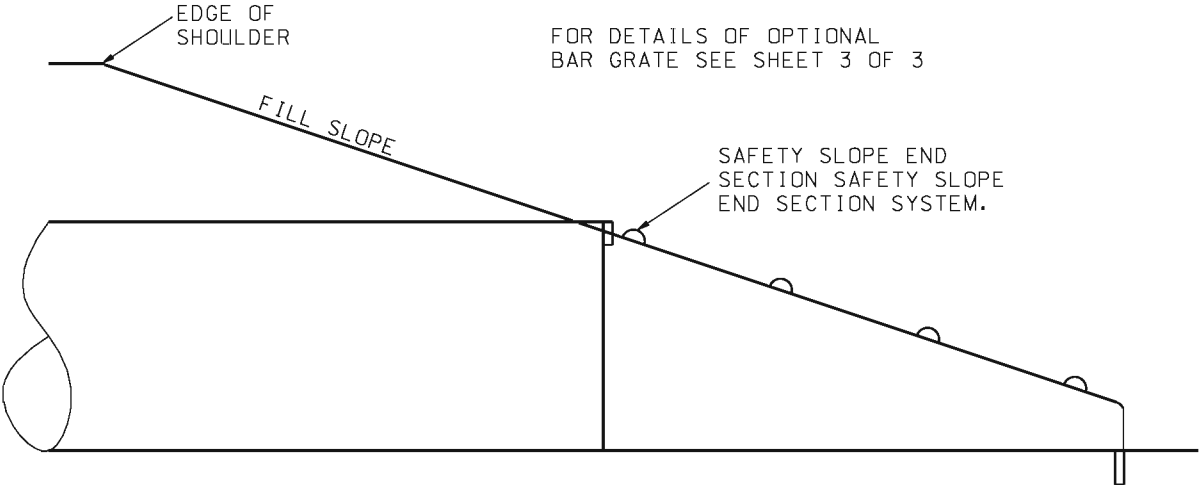
SKIRT SECTIONS FOR 30" AND LARGER PIPES MAY BE MADE FROM UP TO 2 SHEETS JOINED BY RIVETING OR BOLTING ON CENTERLINE.

SKIRT SECTIONS FROM 48" AND LARGER PIPES MAY BE MADE FROM UP TO 3 SHEETS JOINED BY RIVETING OR BOLTING EQUAL DISTANCE FROM CENTERLINE.

ALL 3 PIECE SKIRTS FOR 60" PIPES SHALL HAVE 0.109" THICK SIDES AND 0.138" THICK BOTTOM (CENTER) PANELS. WIDTH OF BOTTOM PANELS SHALL BE GREATER THAN 20% OF THE PIPE PERIPHERY CONNECTOR SECTION. CORNER PLATES AND TOE PLATES SHALL BE GALVANIZED AND OF THE SAME OR GREATER THICKNESS AS THE SKIRT.

| | |
|--|--|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI KATHRYN PHILLIPS HARVEY NUMBER PE-23751 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>SAFETY SLOPE END SECTION</p> |
| <p>DATE EFFECTIVE: 06/01/2013</p> <p>DATE PREPARED: 4/1/2013</p> | <p>732.10H</p> |
| <p>SHEET NO. 1 OF 3</p> | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.




PIPE END DETAILS FOR DRAINAGE STRUCTURES
(SINGLE PIPE INSTALLATION)

NOTE:
SEE DRIVEWAY STANDARD PLANS FOR
BEVELED END SECTION REQUIREMENT.

FOR CONNECTION DETAILS, SEE 732.00
SHEET 3 OF 3.

| METAL END SECTIONS FOR CIRCULAR PIPES | | | | | | | | | | | | |
|---------------------------------------|------------------------------------|-------------------------------|----------------------|--------------|--------------|---------------|--------------|-----------------|-------|-----------------|-------|-----------------|
| PIPE DIA. (IN.) | MIN. GAUGE ENDS (IN.) 4:1 & 6:1 | MIN. GAUGE ENDS (IN.) 10:1 | DIMENSIONS IN INCHES | | | | L DIMENSIONS | | | | | |
| | | | A 1" TOL. | H 1" TOL. | W 2" TOL. | OVERALL WIDTH | SLOPE | LENGTH (IN.) | SLOPE | LENGTH (IN.) | SLOPE | LENGTH (IN.) |
| 15 | 16 | 12 | 8 | 6 | 21 | 37 | 4:1 | 20 | 6:1 | 30 | 10:1 | 70 |
| 18 | 16 | 12 | 8 | 6 | 24 | 40 | 4:1 | 32 | 6:1 | 48 | 10:1 | 100 |
| 21 | 16 | 12 | 8 | 6 | 27 | 43 | 4:1 | 44 | 6:1 | 66 | 10:1 | 130 |
| 24 | 16 | 12 | 8 | 6 | 30 | 46 | 4:1 | 56 | 6:1 | 84 | 10:1 | 160 |
| 30 | 12 | | 12 | 9 | 36 | 60 | 4:1 | 80 | 6:1 | 120 | 10:1 | 220 |
| 36 | 12 | | 12 | 9 | 42 | 66 | 4:1 | 104 | 6:1 | 156 | 10:1 | 280 |
| 42 | 12 | | 16 | 12 | 48 | 80 | 4:1 | 128 | 6:1 | 192 | | |
| 48 | 12 | | 16 | 12 | 54 | 86 | 4:1 | 152 | 6:1 | 228 | | |
| 54 | 12 | | 16 | 12 | 60 | 92 | 4:1 | 176 | 6:1 | 264 | | |
| 60 | 12 | | 16 | 12 | 66 | 98 | 4:1 | 200 | 6:1 | 300 | | |



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

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STATE OF MISSOURI

KATHRYN
PHILLIPS HARVEY

NUMBER
PE-23751

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
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ELECTRONICALLY.

SAFETY SLOPE
END SECTION

DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

732.10H

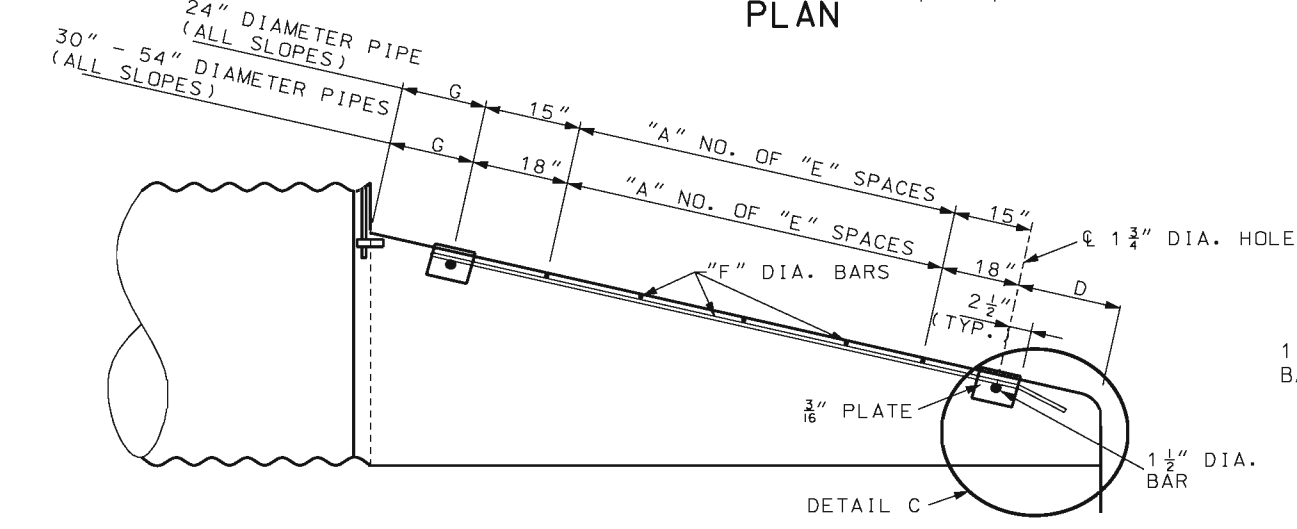
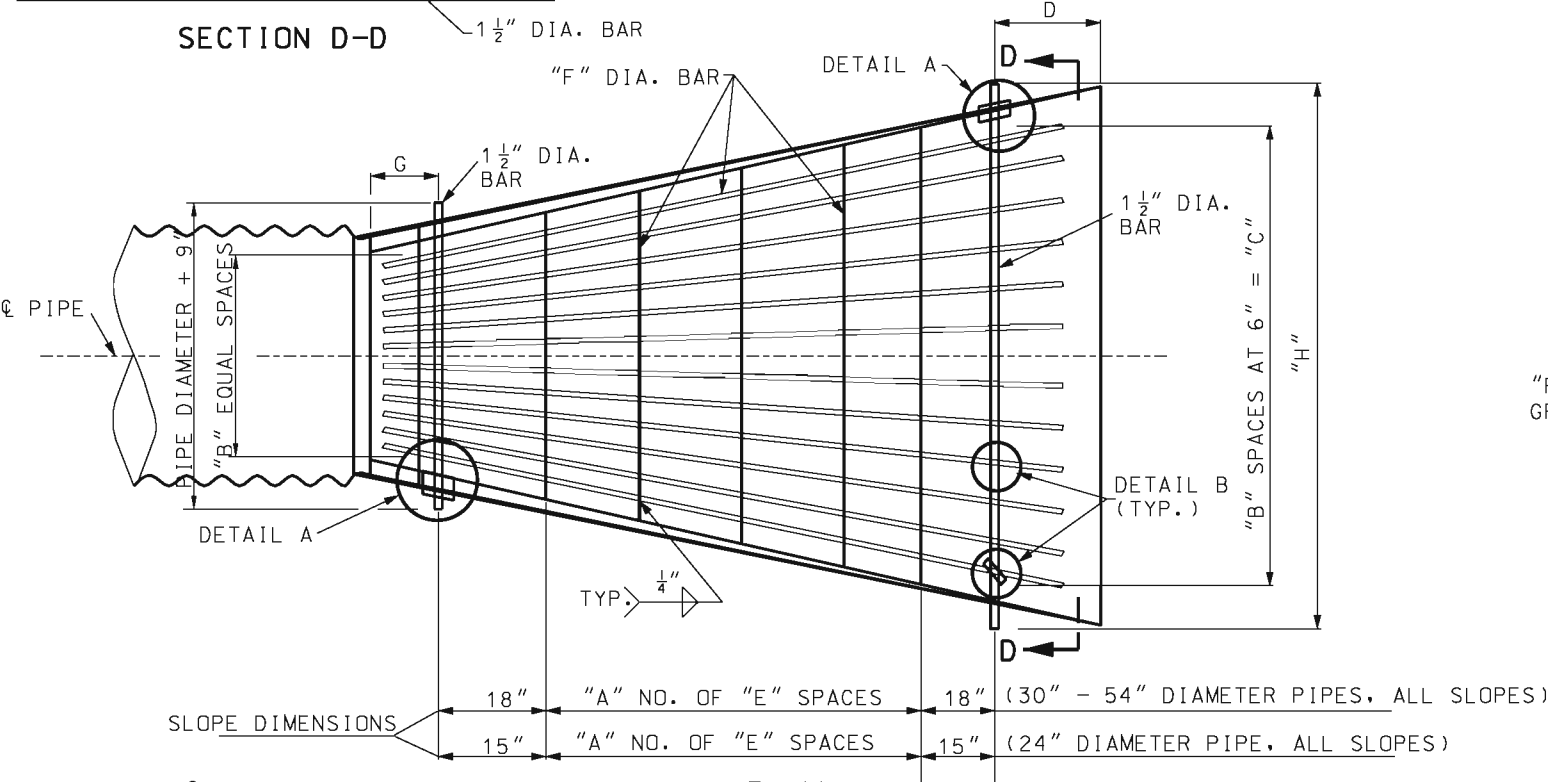
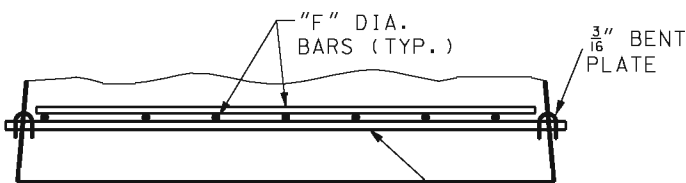
SHEET NO.
2 OF 3

IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

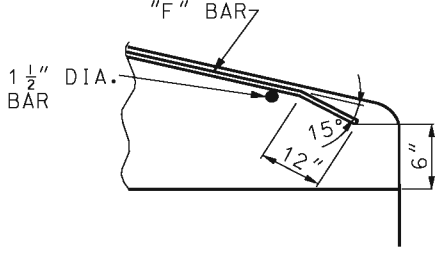
BAR GRATE SYSTEM DATA

| DRAIN PIPE SIZE | 3:1 SLOPE | | | | | | | | | 4:1 SLOPE | | | | | | | | | 6:1 SLOPE | | | | | | | | |
|--------------------|-----------|---|-------|--------------------|-----|-------------------|--------------------|-------|-------|-----------|---|-------|--------------------|-----|-------------------|--------------------|-------|-----|-----------|---|-------|--------------------|-----|-------------------|-----|-------|-------|
| | A | B | C | D | E | "F" BARS | G | H | J | A | B | C | D | E | "F" BARS | G | H | J | A | B | C | D | E | "F" BARS | G | H | J |
| 15"* | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18"* | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21"* | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24" | 0 | 4 | 2'-0" | 6" | 15" | $\frac{5}{8}$ " | 8 $\frac{1}{4}$ " | 3'-3" | 18.4° | 0 | 4 | 2'-0" | 15 $\frac{3}{4}$ " | 15" | $\frac{5}{8}$ " | 12" | 3'-3" | 14° | 2 | 4 | 2'-0" | 13 $\frac{1}{8}$ " | 15" | $\frac{5}{8}$ " | 12" | 3'-3" | 9.5° |
| 30" | 0 | 5 | 2'-6" | 15 $\frac{1}{4}$ " | 18" | $\frac{5}{8}$ " | 12" | 3'-9" | 18.4° | 1 | 5 | 2'-6" | 16 $\frac{1}{2}$ " | 18" | $\frac{5}{8}$ " | 12" | 3'-9" | 14° | 3 | 5 | 2'-6" | 19 $\frac{5}{8}$ " | 18" | $\frac{5}{8}$ " | 12" | 3'-9" | 9.5° |
| 36" | 1 | 6 | 3'-0" | 16 $\frac{1}{4}$ " | 18" | $\frac{3}{4}$ " | 12" | 4'-3" | 18.4° | 2 | 6 | 3'-0" | 18" | 18" | $\frac{3}{4}$ " | 17 $\frac{1}{4}$ " | 4'-3" | 14° | 5 | 6 | 3'-0" | 20 $\frac{1}{8}$ " | 18" | $\frac{3}{4}$ " | 12" | 4'-3" | 9.5° |
| 42" | 2 | 7 | 3'-6" | 17 $\frac{1}{4}$ " | 18" | 1" | 12" | 4'-9" | 18.4° | 4 | 7 | 3'-6" | 12" | 18" | 1" | 12" | 4'-9" | 14° | 7 | 7 | 3'-6" | 11 $\frac{7}{8}$ " | 18" | 1" | 9" | 4'-9" | 10.1° |
| 48" | 3 | 8 | 4'-0" | 18" | 18" | 1" | 12 $\frac{5}{8}$ " | 5'-3" | 18.4° | 5 | 8 | 4'-0" | 18" | 18" | 1" | 12 $\frac{5}{8}$ " | 5'-3" | 14° | 7 | 8 | 4'-0" | 13" | 18" | 1" | 9" | 5'-3" | 11.9° |
| 54" | 4 | 9 | 4'-6" | 18" | 18" | 1 $\frac{1}{8}$ " | 13 $\frac{3}{8}$ " | 5'-9" | 18.4° | 6 | 9 | 4'-6" | 18" | 18" | 1 $\frac{1}{8}$ " | 19 $\frac{3}{8}$ " | 5'-9" | 14° | 7 | 9 | 4'-6" | 14 $\frac{1}{4}$ " | 18" | 1 $\frac{1}{8}$ " | 9" | 5'-9" | 13.7° |

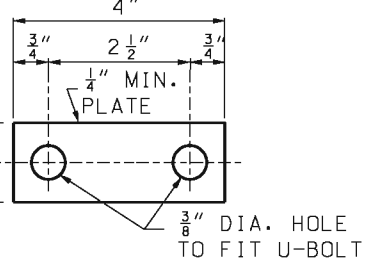
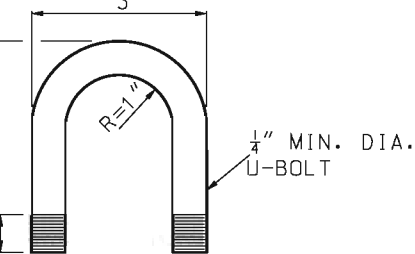
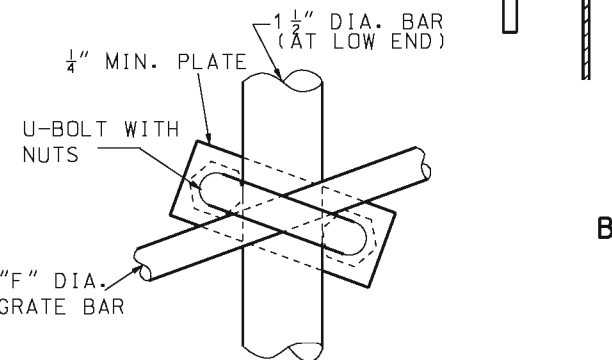
* BAR GRATE SYSTEM IS NOT REQUIRED FOR DRAIN PIPE DIAMETER OF 21" OR LESS, FOR SINGLE PIPE INSTALLATIONS.



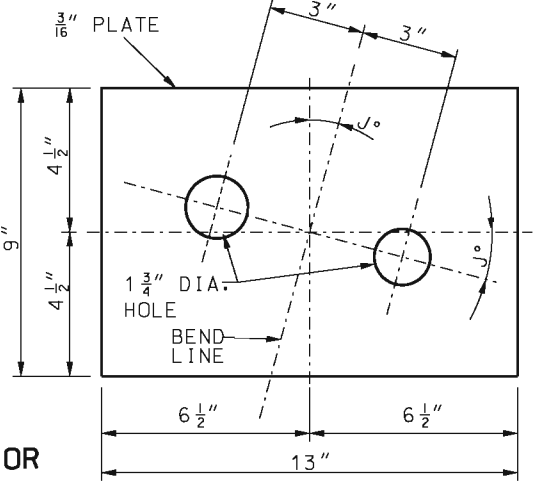
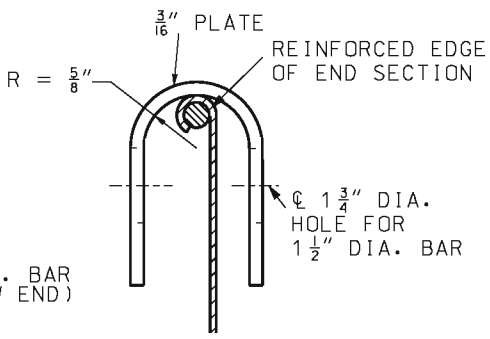
ELEVATION



DETAIL C



DETAIL B U-BOLT ANCHOR



DETAIL A BENT PLATE ANCHOR

GENERAL NOTES:

ALL STEEL MATERIAL FOR BAR GRATE SYSTEM SHALL BE IN ACCORDANCE WITH ASTM A575 GRADE 1020 STEEL.

ALL MATERIAL IN GRATE SYSTEM SHALL BE GALVANIZED.

GALVANIZING SHALL BE DONE IN ACCORDANCE WITH ASTM A123.

ALL MATERIALS, FABRICATION AND INSTALLATION OF OPTIONAL BAR GRATE SYSTEM USED IN LIEU OF SAFETY BAR SYSTEM SHALL BE INCLUDED IN CONTRACT UNIT PRICE BID FOR END SECTION (SAFETY SLOPE).

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

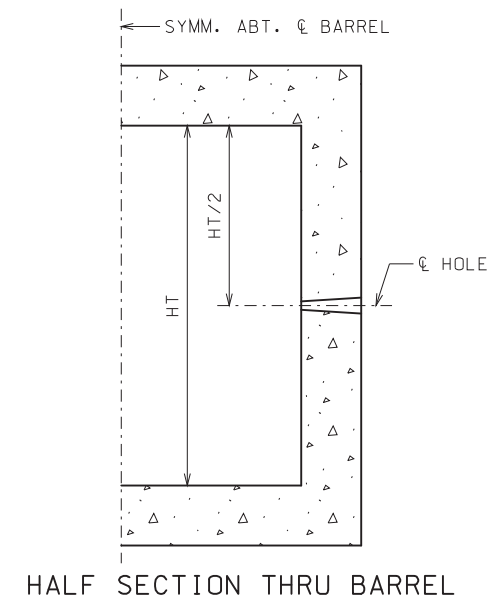
OPTIONAL BAR GRATE SYSTEM FOR SAFETY SLOPE END SECTION

DATE EFFECTIVE: 06/01/2013
DATE PREPARED: 4/1/2013

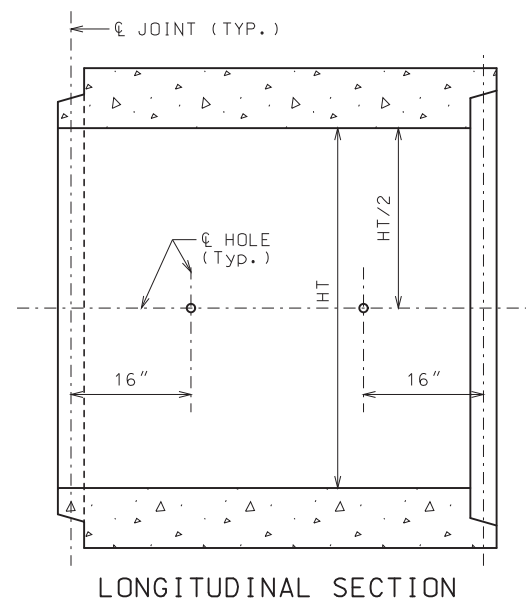
732.10H

SHEET NO.
3 OF 3

IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

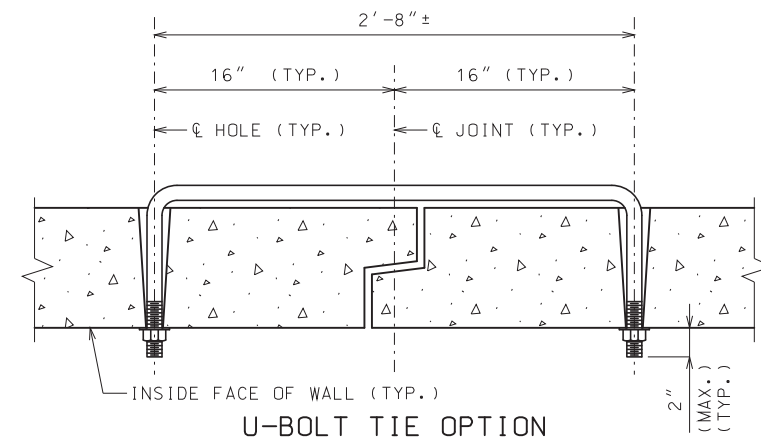


HALF SECTION THRU BARREL

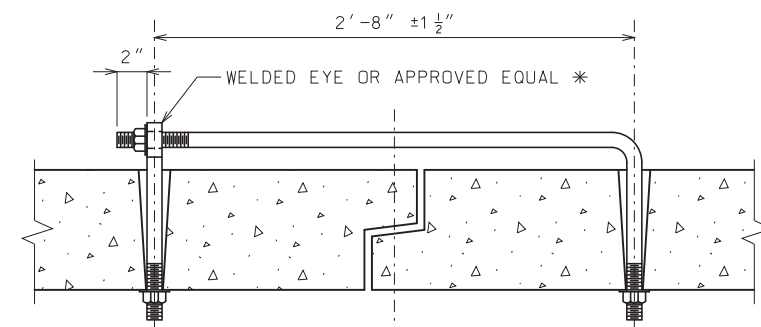


LONGITUDINAL SECTION

PLACEMENT OF HOLES

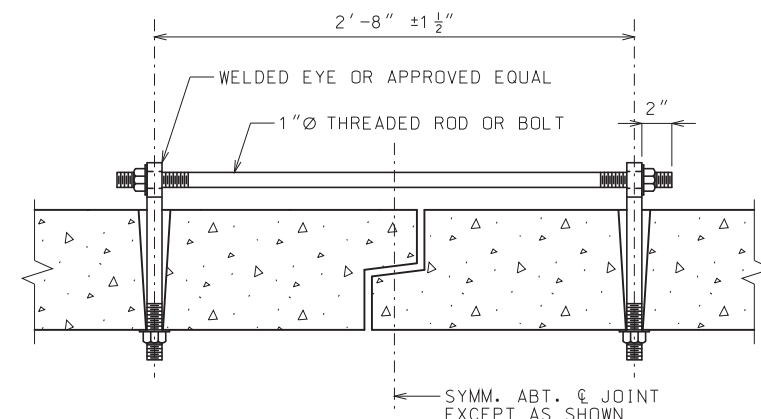


U-BOLT TIE OPTION



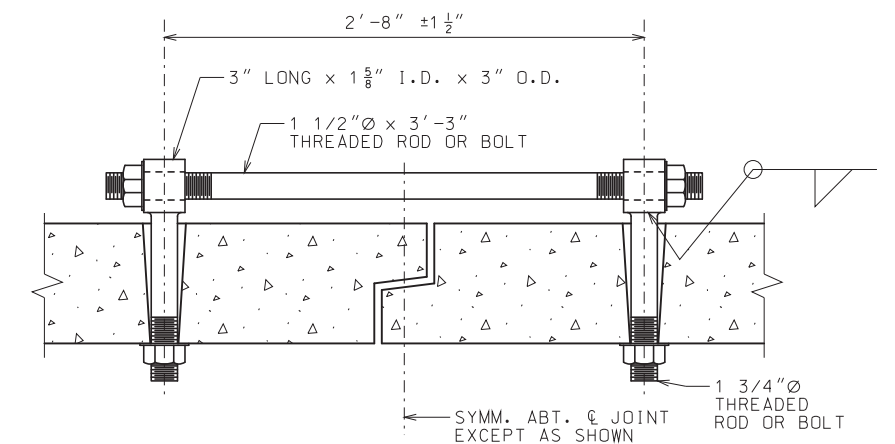
* THE CONNECTIONS SHALL BE PLACED AT DOWNSTREAM END WHEN PLACED INSIDE OF STRUCTURE.

EYE BOLT TIE OPTION



DOUBLE CONNECTION TIE OPTION

REGULAR STRENGTH CONNECTION DETAILS



DOUBLE CONNECTION TIE

EXTRA STRENGTH CONNECTION DETAILS

GENERAL NOTES:

TIES SHALL BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

TIE ROD THREADS SHALL PROJECT TO THE INSIDE OF CULVERT EXCEPT AS NOTED ON PLANS.

HOLES:
HOLES SHALL BE CAST OR DRILLED 16 INCHES FROM CENTERLINE OF JOINT AS SHOWN, UNLESS FORMS ARE SET UP FOR 16-INCH SPACING FROM OUTSIDE OF JOINT.


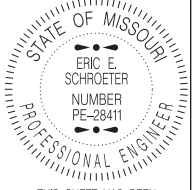
TAPERED HOLES ARE PERMITTED WHEN PRECAST.

REGULAR STRENGTH CONNECTIONS:
REGULAR STRENGTH CULVERT TIES SHALL BE 1" Ø THREADED RODS.

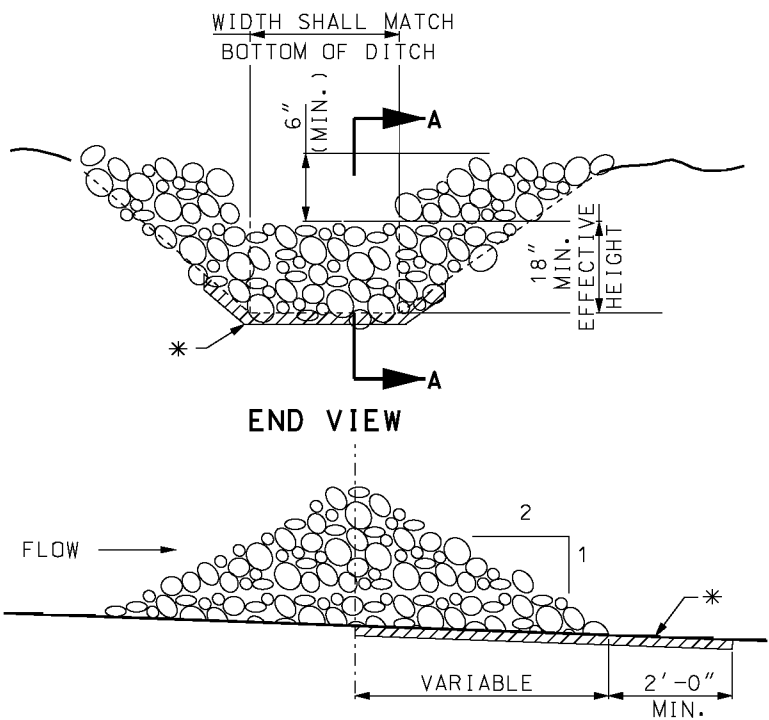
TIE RODS FOR REGULAR STRENGTH CONNECTIONS SHALL BE GALVANIZED IN ACCORDANCE WITH SEC 1081.

EXTRA STRENGTH CONNECTIONS:
THREADED RODS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A193 OR A320.

NUTS FOR EXTRA STRENGTH CONNECTIONS SHALL BE STAINLESS STEEL IN ACCORDANCE WITH ASTM A194 AND OF GRADE EQUIVALENT TO GRADE USED FOR THREADED RODS.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>PRECAST CONCRETE BOX CULVERT TIES</p> |
| DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | 733.00 |
| SHEET NO. 1 OF 1 | |

ROCK DITCH CHECK



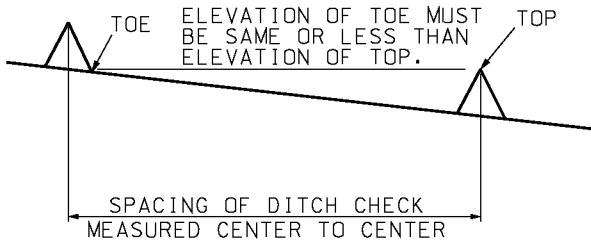
* GEOTEXTILE LINING MAY BE INSTALLED AS REQUIRED BY THE ENGINEER.

NOTE:

ROCK DITCH CHECK IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.

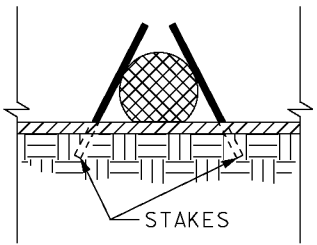
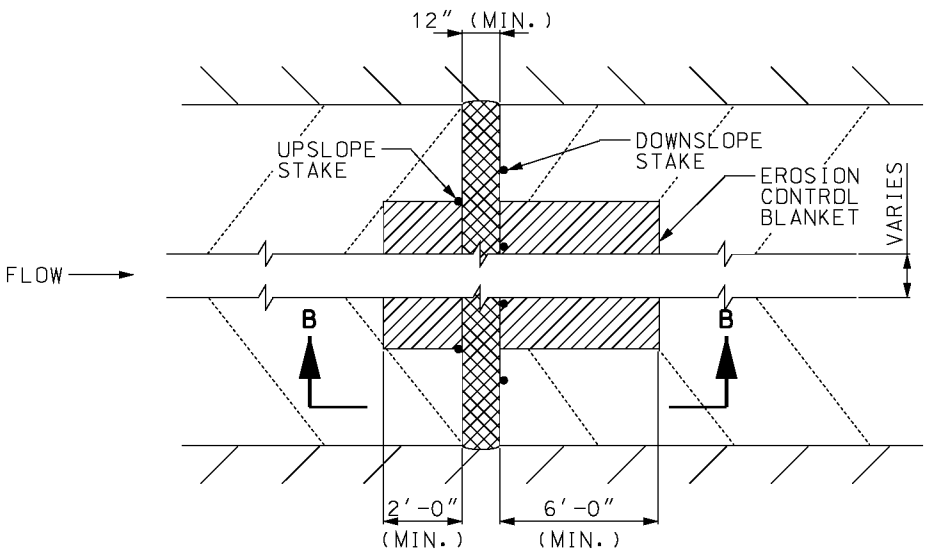
EXAMPLE
DITCH CHECK SPACING
FOR STANDARD HEIGHTS
(FT.)

| DITCH & SLOPE % | SPACING FOR 9" EFF. HEIGHT | SPACING FOR 18" EFF. HEIGHT |
|-----------------|----------------------------|-----------------------------|
| 0.5 | 150 | 300 |
| 1.0 | 75 | 150 |
| 1.5 | 50 | 100 |
| 2.0 | 37 | 75 |
| 2.5 | 30 | 60 |
| 3.0 | 25 | 50 |
| 3.5 | 21 | 43 |
| 4.0 | 19 | 38 |
| 4.5 | 16 | 33 |
| 5.0 | 15 | 30 |
| 5.5 | 13 | 27 |
| 6.0 | 12 | 25 |
| 6.5 | 11 | 23 |
| 7.0 | 10 | 21 |
| 7.5 | 10 | 20 |
| 8.0 | 9 | 19 |
| 8.5 | 9 | 18 |
| 9.0 | 8 | 17 |
| 9.5 | 8 | 16 |
| 10.0 | 7 | 15 |

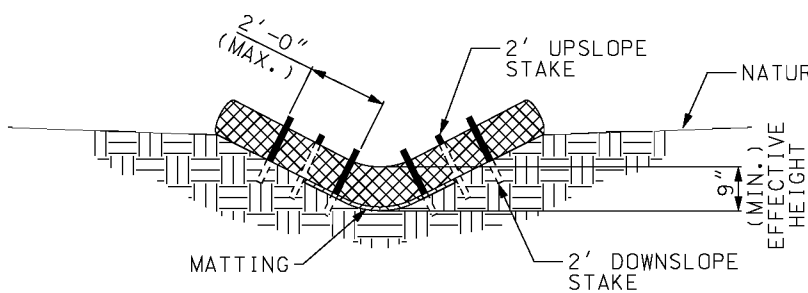


MINIMUM DITCH CHECK SPACING

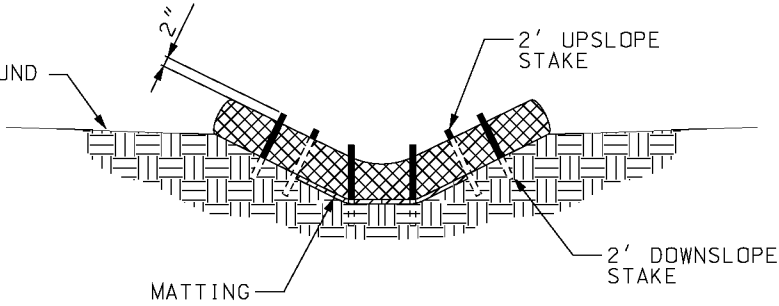
ALTERNATE DITCH CHECK



SECTION B-B



TYPICAL SECTION
VEE DITCH



TYPICAL SECTION
TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER LOG/SOCK.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL LOG/SOCK TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND LOG/SOCK AND SCOUR DITCH SLOPES OR AS DIRECTED BY ENGINEER.


INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE LOG/SOCK TO BOTTOM OF DITCH.

EROSION CONTROL BLANKET SHALL BE ANCHORED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.


GENERAL NOTES:

OTHER PROPRIETARY DITCH CHECKS MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.

INSTALLATION OF PROPRIETARY DITCH CHECKS SHALL BE ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.



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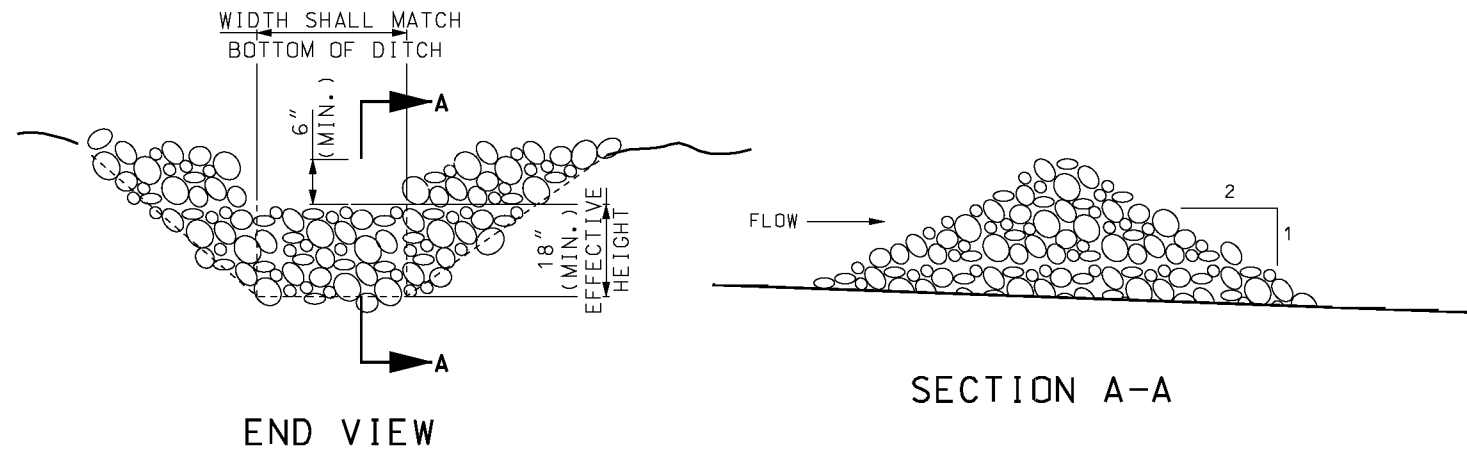


TEMPORARY EROSION CONTROL MEASURES
TEMPORARY DITCH CHECKS

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

806.10J

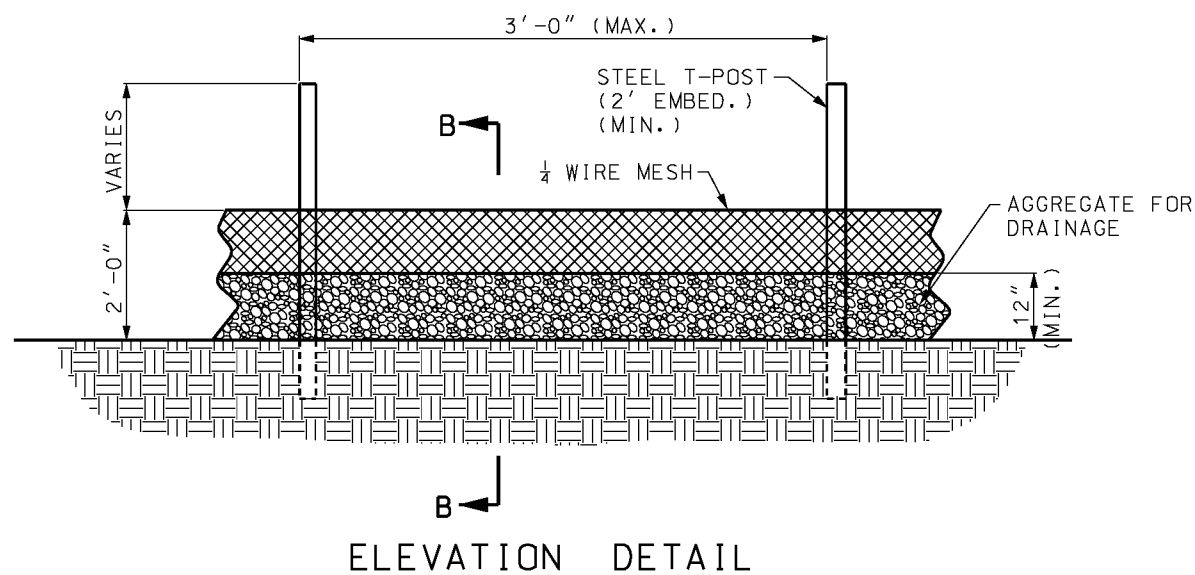
SHEET NO.
1 OF 6



NOTE:

SEDIMENT TRAP

SEDIMENT TRAP IN THE CLEAR ZONE SHALL BE REMOVED OR LEVELED (IF ALLOWABLE) AFTER THE VEGETATION HAS SUFFICIENTLY MATURED TO PROTECT THE DITCH OR SWALE.



NOTES:

AGGREGATE FOR DRAINAGE SHALL BE IN ACCORDANCE WITH SEC 1009, GRADE 4 OR GRADE 5.

USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH 1/4 INCH MESH OPENINGS.

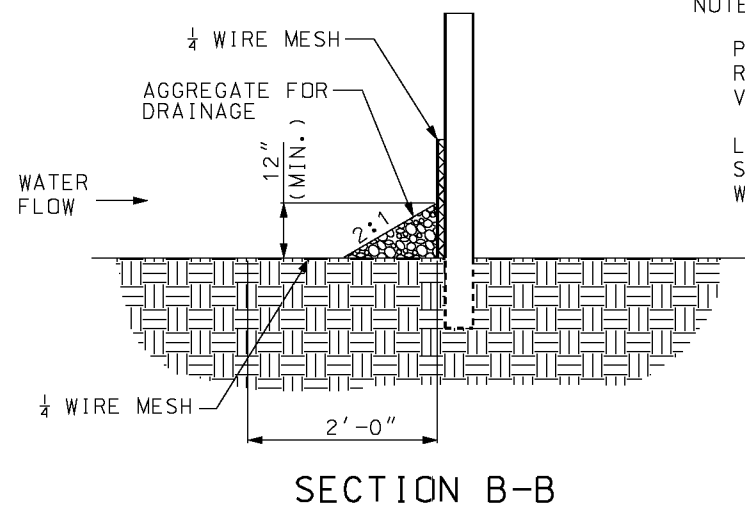
INSTALL 5 FT. T-POST WITH A 2 FOOT EMBEDMENT DEPTH (MIN.).

ATTACH HARDWARE CLOTH TO POST WITH WIRE STAPLE OR OTHER ACCEPTABLE METHODS

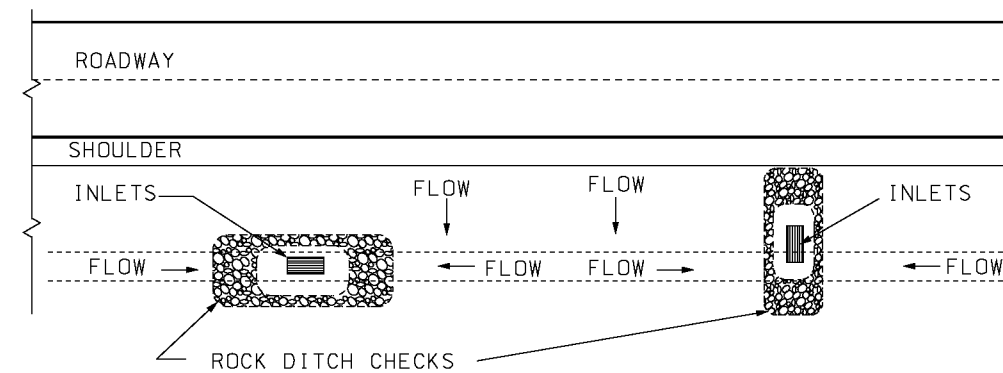
SPACE POST A MAXIMUM OF 3 FT.

FOR INSTALLATION BETWEEN SECTIONS OF SILT FENCE, EXTEND AGGREGATE FOR DRAINAGE A MINIMUM OF 12 INCHES ON EACH SIDE OF SPECIAL SEDIMENT CONTROL FENCE SECTION.

INSTALLATION SHALL BE FOR AREA INLETS AND PERIMETER PROTECTION BMP'S.

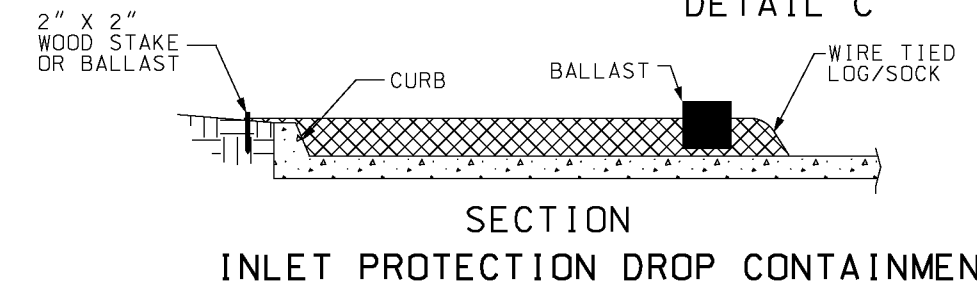
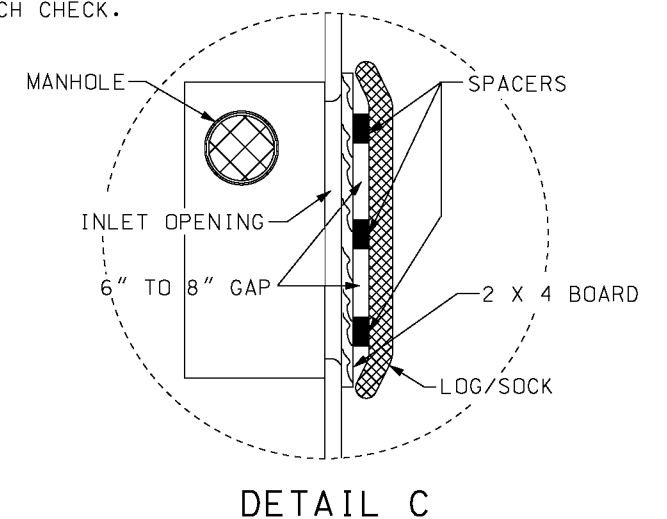
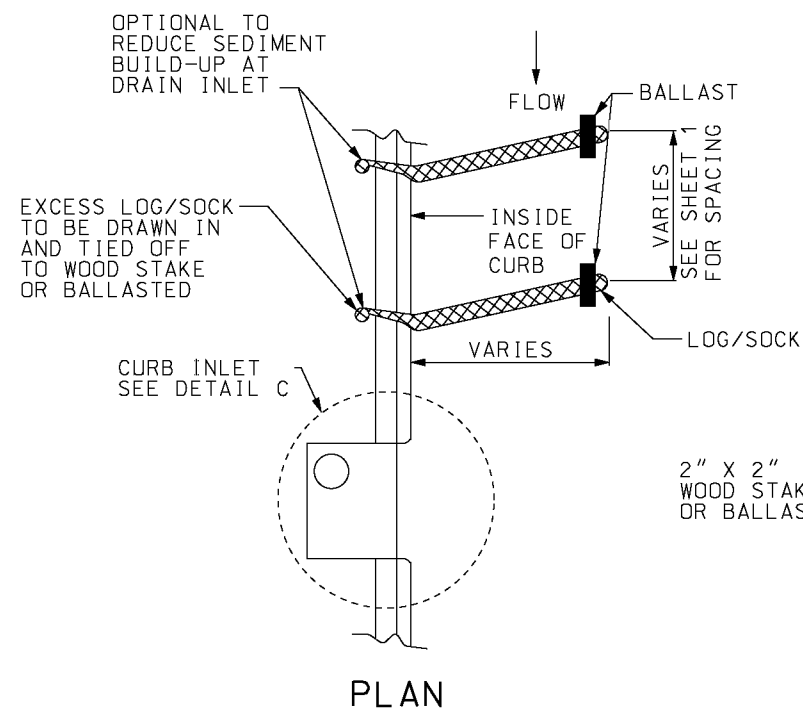


ROCK/MESH SEDIMENT CONTROL FENCE



DROP INLET CHECK

SEE SHEET 1 OF 6 FOR DETAILS OF ROCK DITCH CHECK.



NOTES:

PRIOR TO PLACEMENT ALL DEBRIS, ROCK, LARGE CLODS AND WOOD VEGETATION SHALL BE CLEARED.

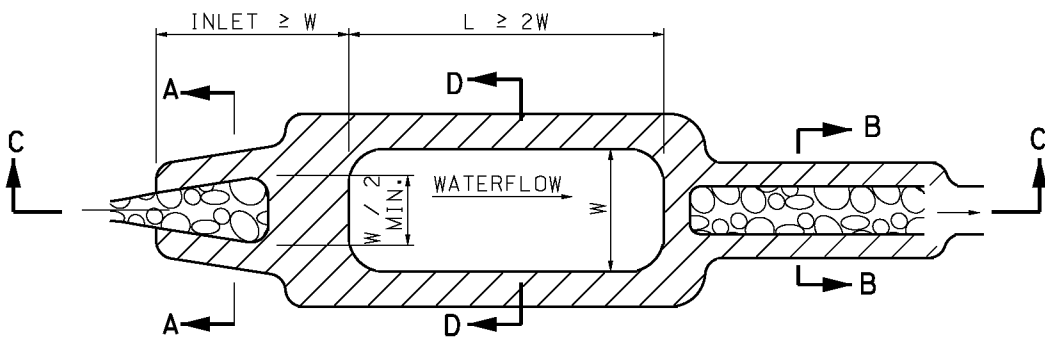
LOG/SOCK PLACED ON PAVEMENT SHALL BE WEIGHTED DOWN WITH GRAVEL/SAND BALLAST.

GENERAL NOTES:

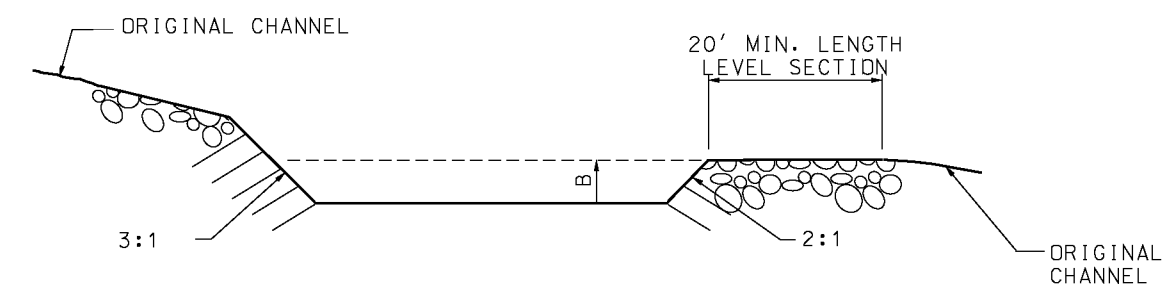
OTHER PROPRIETARY INLET PROTECTION MAY BE SUBSTITUTED IN ACCORDANCE WITH SEC 806 OR AS DIRECTED BY THE ENGINEER.

FOR SEDIMENT CONTROL SPACING SEE SHEET 1 OF 6.

| | |
|--|--|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY EROSION CONTROL MEASURES</p> |
| <p>DATE EFFECTIVE: 04/01/2015</p> <p>DATE PREPARED: 2/20/2015</p> | <p>806.10J</p> |
| <p>SHEET NO. 2 OF 6</p> | |

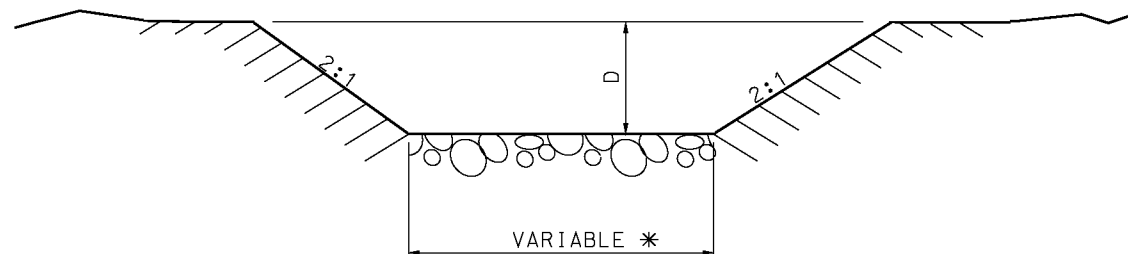


PLAN VIEW



SECTION C-C

EFFECTIVE DEPTH "B" = MIN. 2', MAX. 6' DEPENDENT UPON CONFIGURATION REQUIRED BY LOCATION AND ESTIMATED VOLUME.

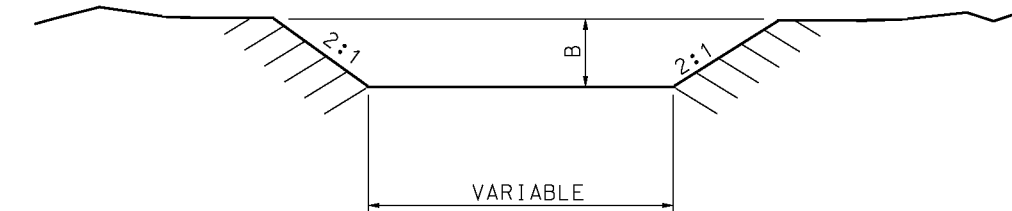


SECTION A-A

INLET

D = 1.0' + DESIGN FLOW DEPTH-MIN.

* VARIES FROM WIDTH OF STREAM AT INLET TO ONE-HALF WIDTH OF POND AT OUTLET.



SECTION D-D

GENERAL NOTES:

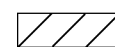
SEDIMENT BASINS ARE TO BE INCLUDED IN THE BMP SYSTEM WHEN THE GEOMETRY OF RIGHT-OF-WAY ALLOWS. WHERE INCLUDED, SEDIMENT BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE STORAGE VOLUME FOR THE LOCAL 2-YR, 24-HOUR STORM FOR DISTURBED ACREAGE DRAINING TO THEM. IF THE DESIGN STORM VOLUME HAS NOT BEEN CALCULATED, BASINS ARE TO BE DESIGNED AND CONSTRUCTED TO PROVIDE A STORAGE VOLUME OF AT LEAST 3,600 CUBIC FEET PER DISTURBED ACRE DRAINING TO THE BASIN(S).

IF SEDIMENT BASIN IS TO BE PERMANENT ITS SLOPES SHALL BE STABILIZED WITH ROCK RIPRAP OR EQUIVALENT.

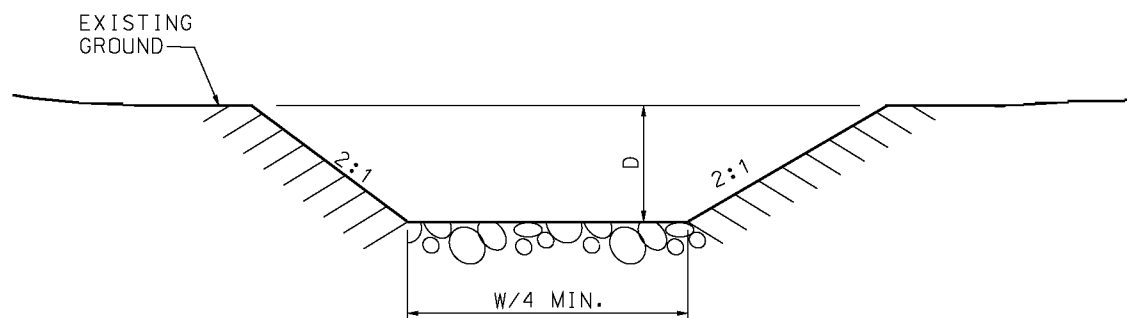
THE MATERIALS FOR ROCK RIPRAP SHALL MEET THE REQUIREMENTS OF SEC 611.30 FOR TYPE 2 ROCK BLANKET.

SEE PLANS FOR LENGTH, DEPTH AND WIDTH OF BASIN.

SEE PLANS FOR ESTIMATED QUANTITIES OF ROCK RIPRAP - CUBIC YARDS.



LAYER OF APPROVED STABILIZING MATERIAL FOR SCOUR PREVENTION



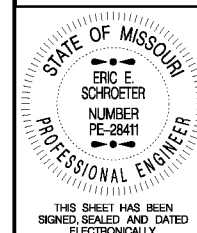
SECTION B-B

OUTLET



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



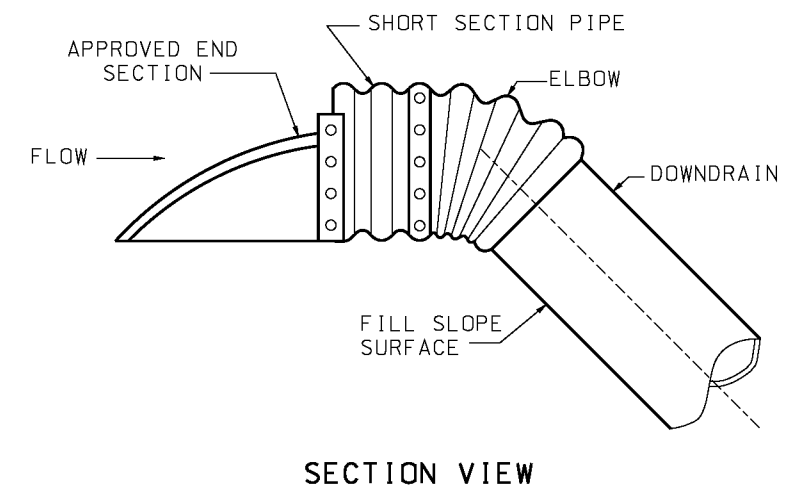
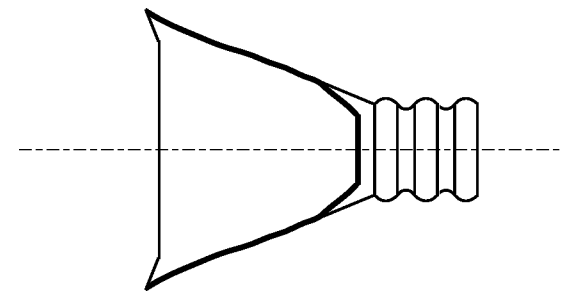
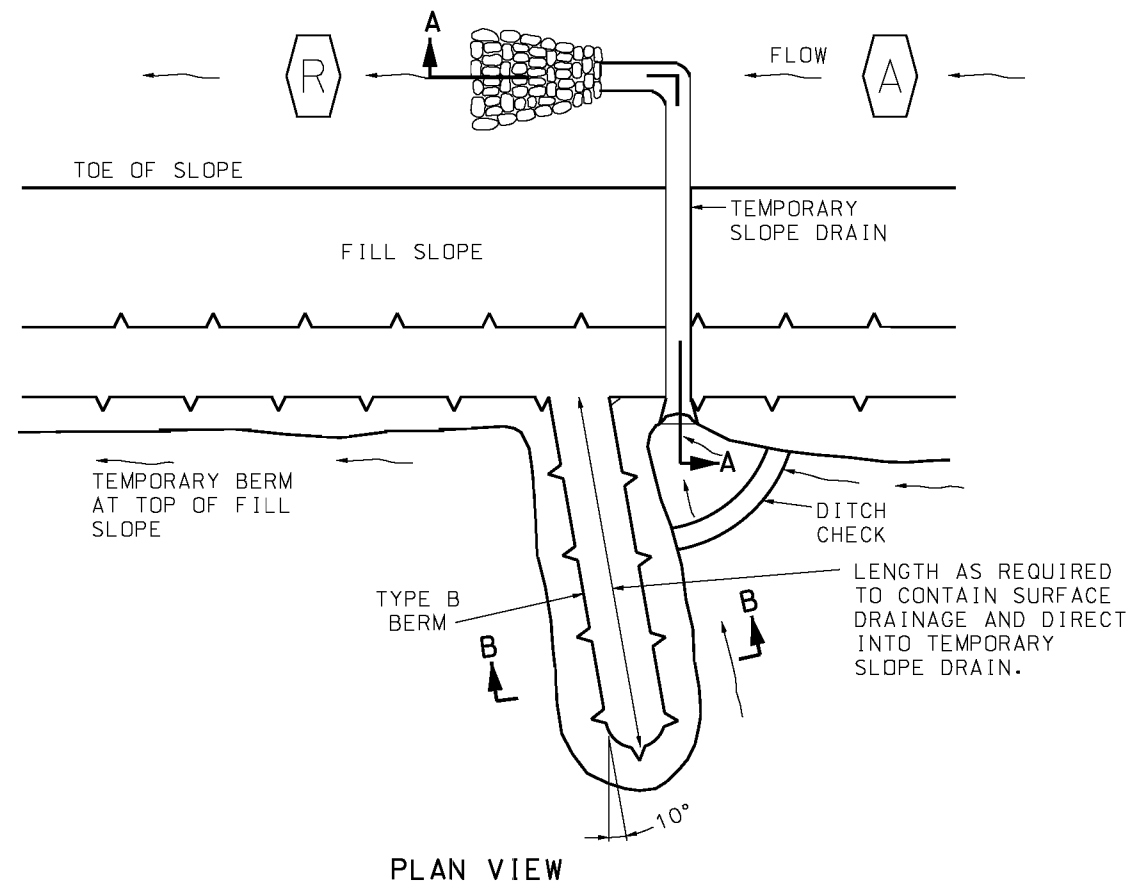
TEMPORARY EROSION CONTROL MEASURES
SEDIMENT BASIN

DATE EFFECTIVE: 04/01/2015
DATE PREPARED: 2/20/2015

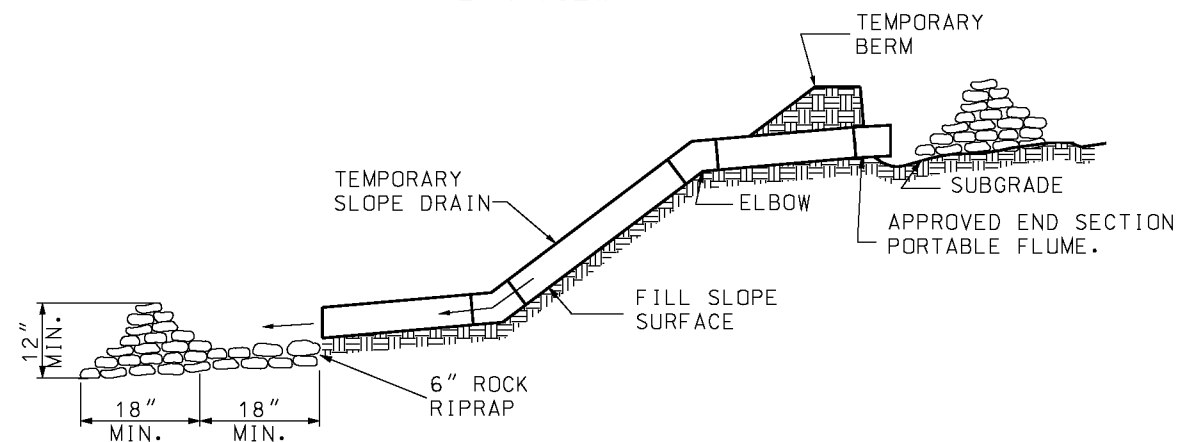
806.10J

SHEET NO.
3 OF 6

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



TEMPORARY SLOPE DRAIN INLET TREATMENT



NOTE:

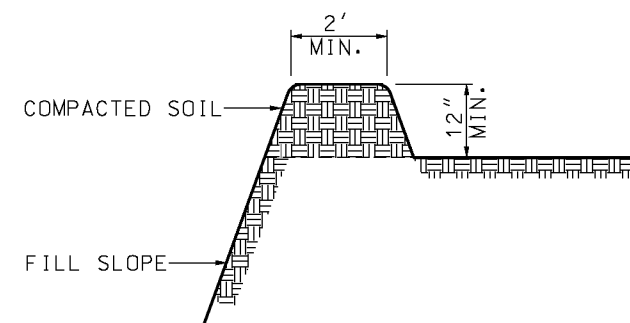
IN SOME CASES IT MAY BE NECESSARY TO EMBED METAL OR PLASTIC PIPE INTO THE FILL SLOPE TO SECURE PROPER ANCHORAGE.


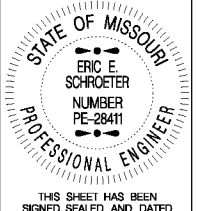
TEMPORARY BERM

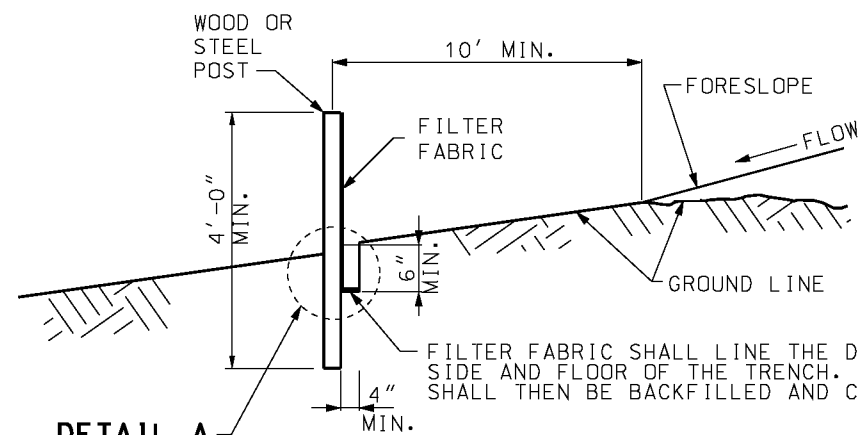
(METAL, FLEXIBLE RUBBER OR PLASTIC PIPE)

NOTE:

MAXIMUM LENGTH BETWEEN SLOPE DRAINS SHALL BE APPROXIMATELY 500 FEET.

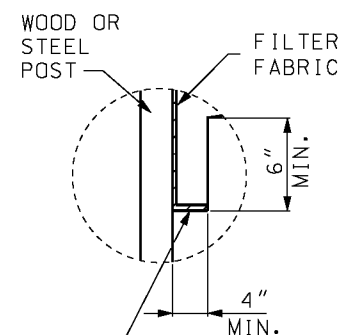


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|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TEMPORARY EROSION CONTROL MEASURES SLOPE DRAINS |
| DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 806.10J |
| SHEET NO. 4 OF 6 | |

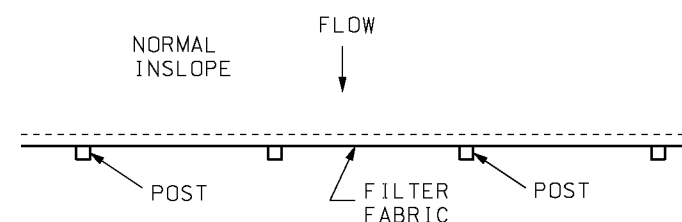


DETAIL A

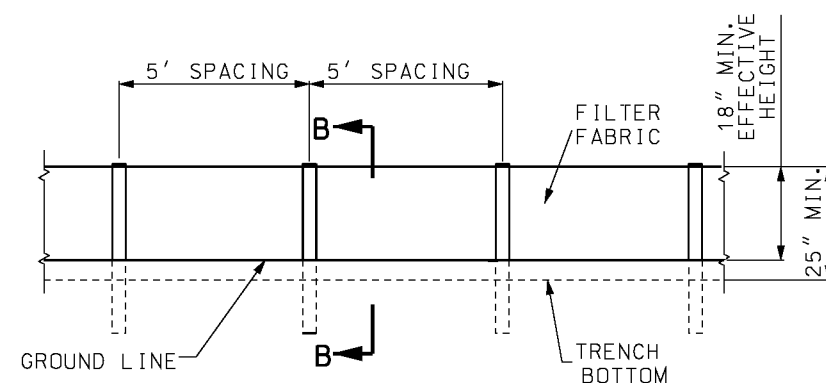
TYPICAL B-B



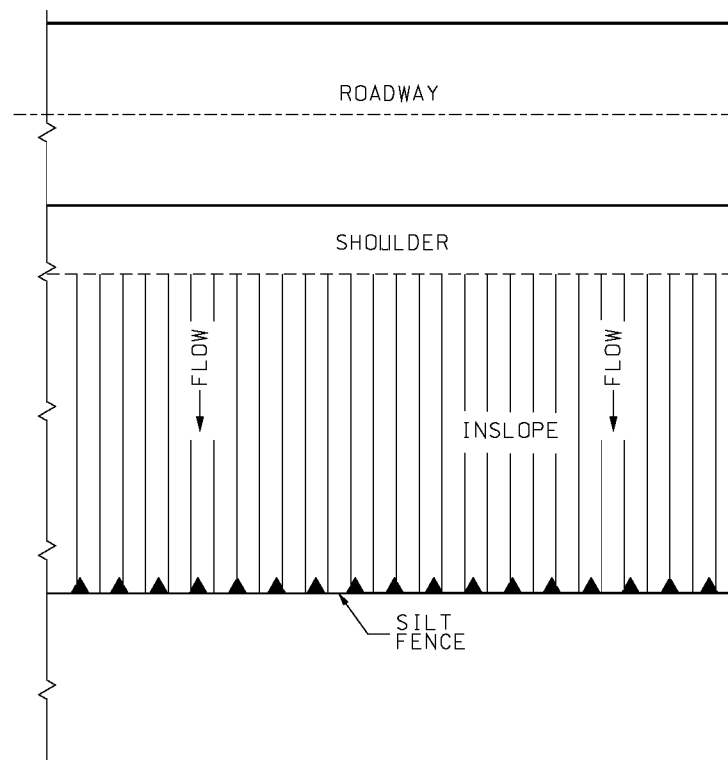
DETAIL A



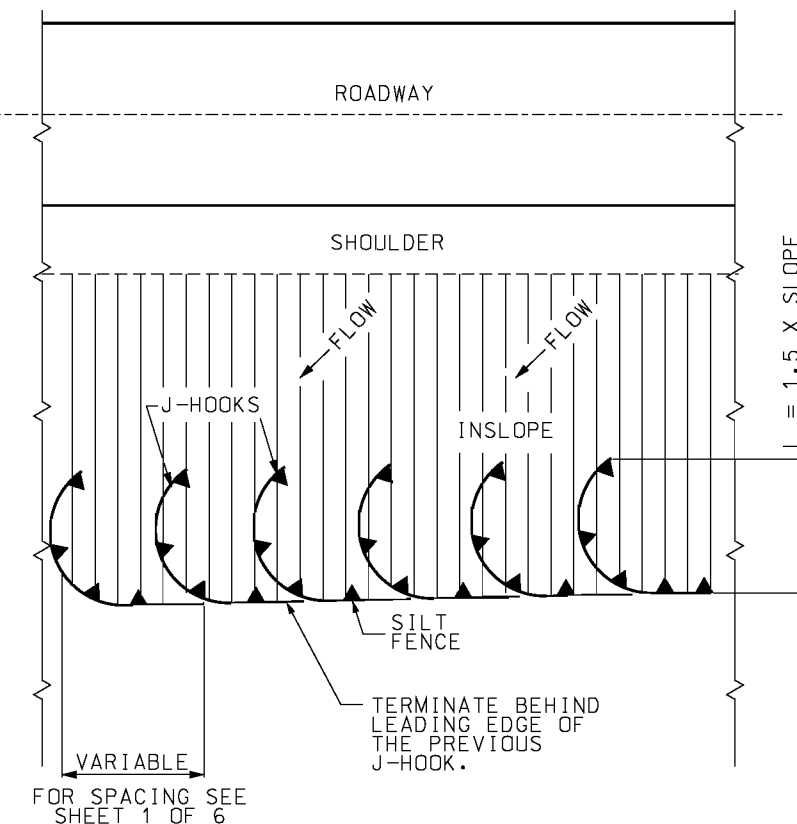
PLAN VIEW



ELEVATION DETAIL
FABRIC SILT FENCE



PERIMETER SILT FENCE
FOR TRANSVERSE FLOW



PERIMETER SILT FENCE
FOR ANGULAR FLOW

GENERAL NOTES:

USE SILT FENCE FOR FILL HEIGHTS GREATER OR EQUAL TO 10 FEET. ON ALL FILLS GREATER THAN 10 FEET HIGH, MID-SLOPE RUNS OF SILT FENCE SHOULD BE CONSIDERED.

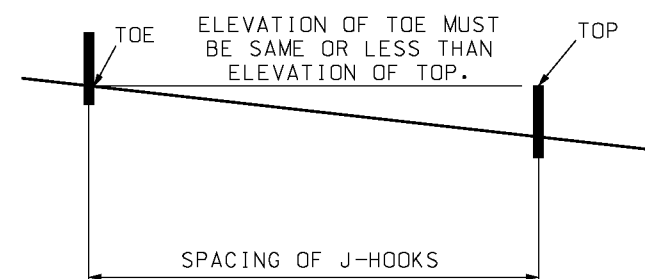
FOR FABRIC SILT FENCE:

MINIMUM LONGITUDINAL SPLICE OVERLAP SHALL BE 2' WITH A POST AT EACH END.


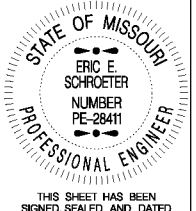
SECURE FABRIC TO POSTS.

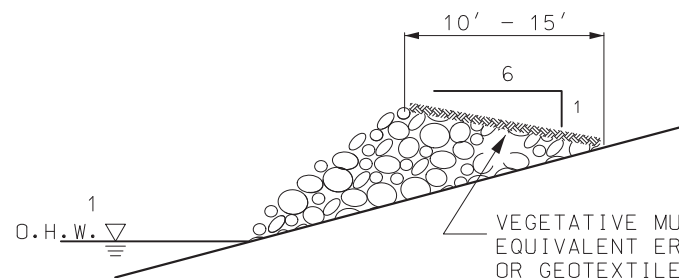
INSTEAD OF SILT FENCE ACROSS DRAINAGE DITCHES AND DRAINS, DITCH CHECKS SHALL BE USED AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER.

AT CULVERTS, PLACE SEDIMENT BARRIERS OVER THE TOP OF THE CULVERTS (NOT IN THE STREAM CHANNEL).



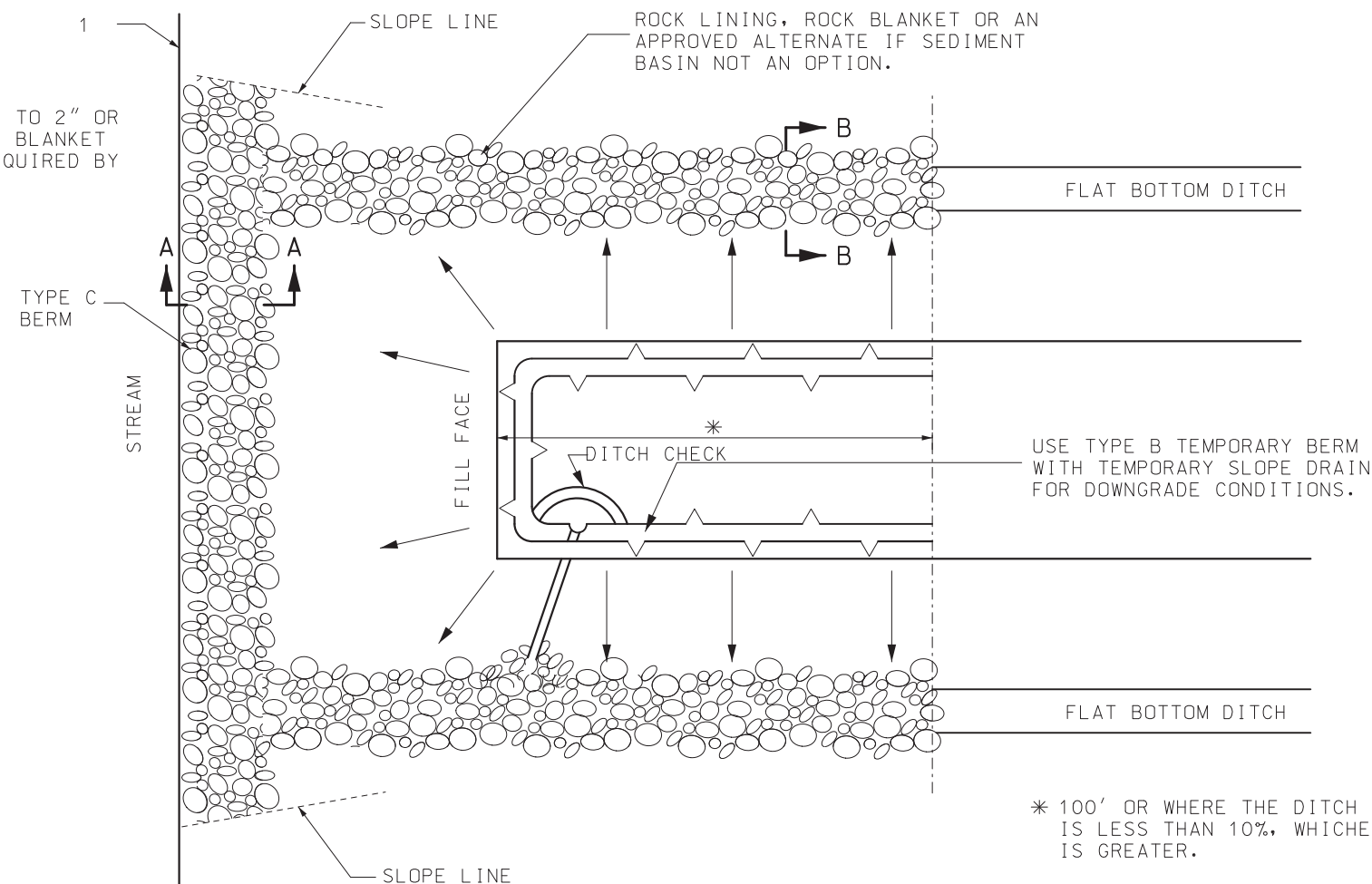
MINIMUM J-HOOK SPACING

| | | |
|--|--|----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | TEMPORARY EROSION CONTROL MEASURES SILT FENCE | |
| | DATE EFFECTIVE: 04/01/2015 DATE PREPARED: 2/20/2015 | 806.10J |



SECTION A-A
TYPE C BERM

(1) TYPE C BERM SHALL BE PLACED ABOVE THE ORDINARY HIGH WATER (O.H.W.) OR AT AN ELEVATION AS DIRECTED BY THE ENGINEER.



PLAN VIEW


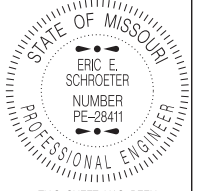


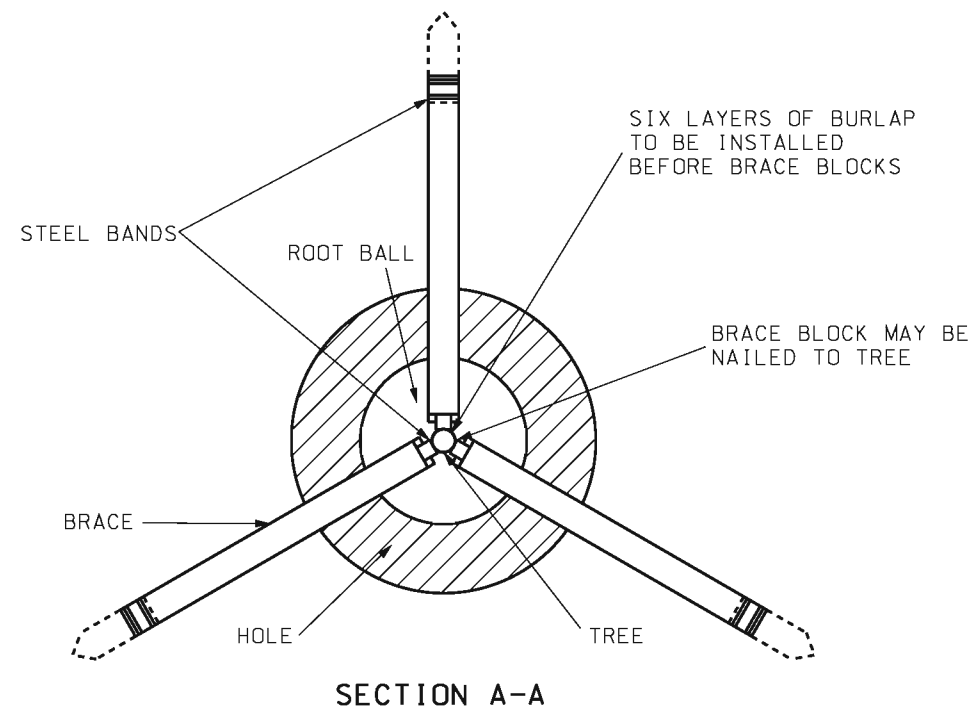
SECTION B-B

GENERAL NOTES:

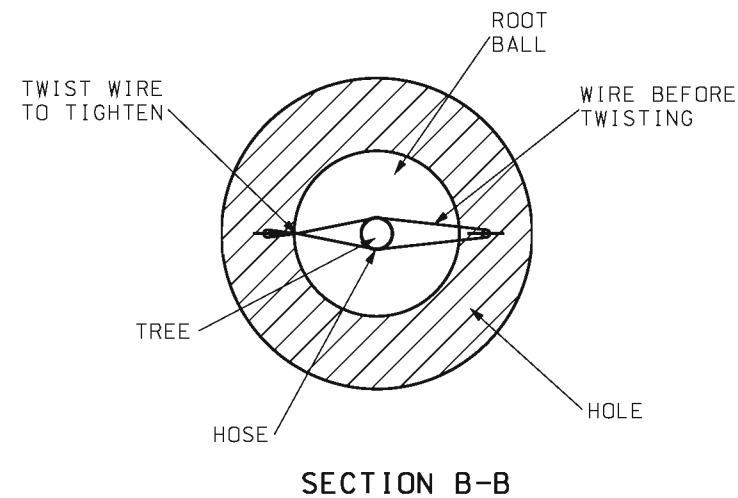
TYPE C BERM SHALL BE BUILT TO HANDLE SIGNIFICANT RUN-OFF EVENTS AND SHALL BE INSTALLED PRIOR TO SOIL DISTURBANCE OR PLACEMENT OF FILL IN THE DRAINAGE AREA OF THE BERM.

* 100' OR WHERE THE DITCH SLOPE IS LESS THAN 10%, WHICHEVER IS GREATER.

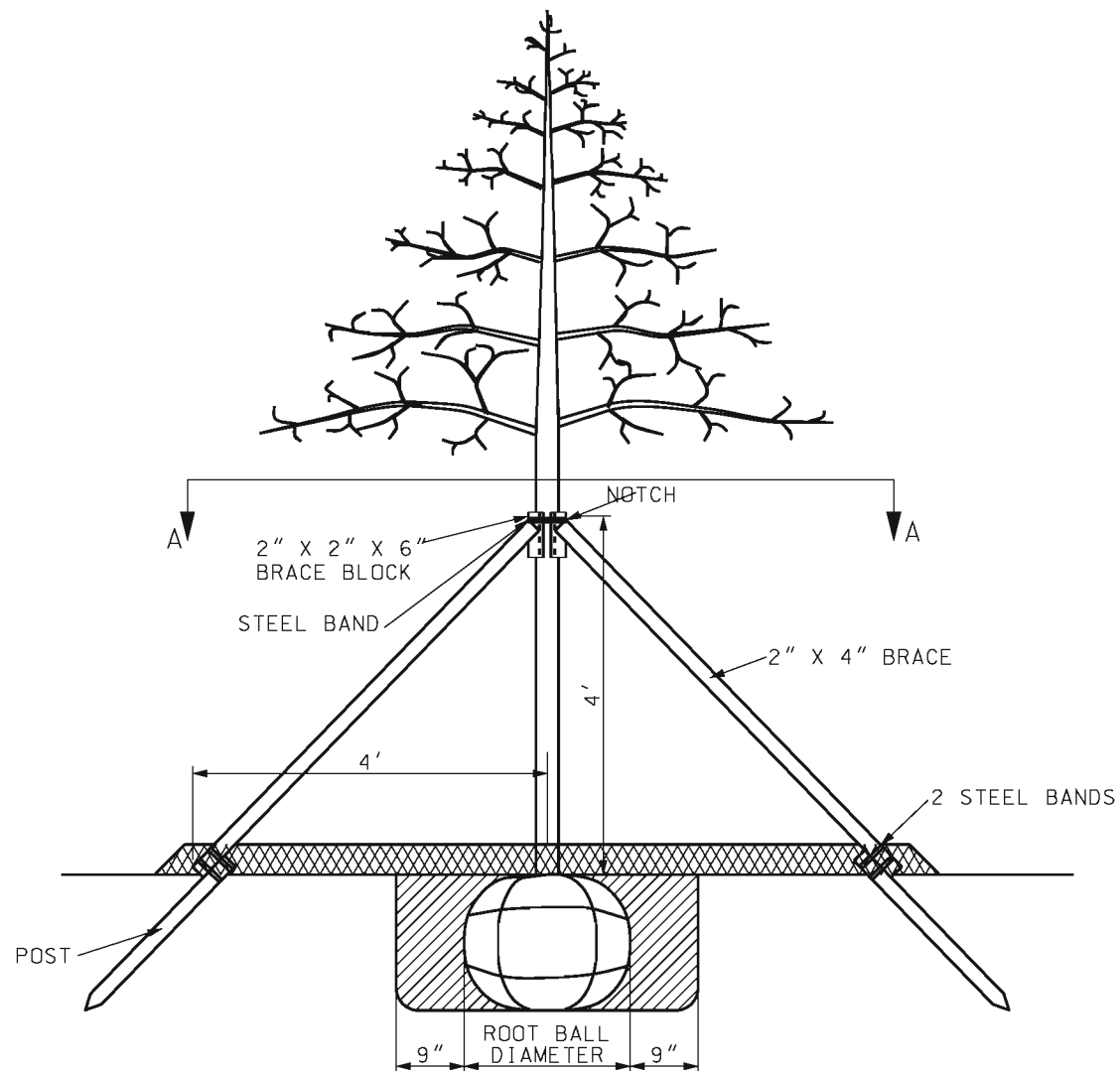
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|--|--|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TEMPORARY EROSION CONTROL MEASURES</p> <p>BRIDGES AND BOX CULVERTS AT STREAM CROSSINGS</p> |
| <p>DATE EFFECTIVE: 04/01/2019</p> <p>DATE PREPARED: 1/16/2019</p> | <p>806.10J</p> |
| <p>SHEET NO. 6 OF 6</p> | |



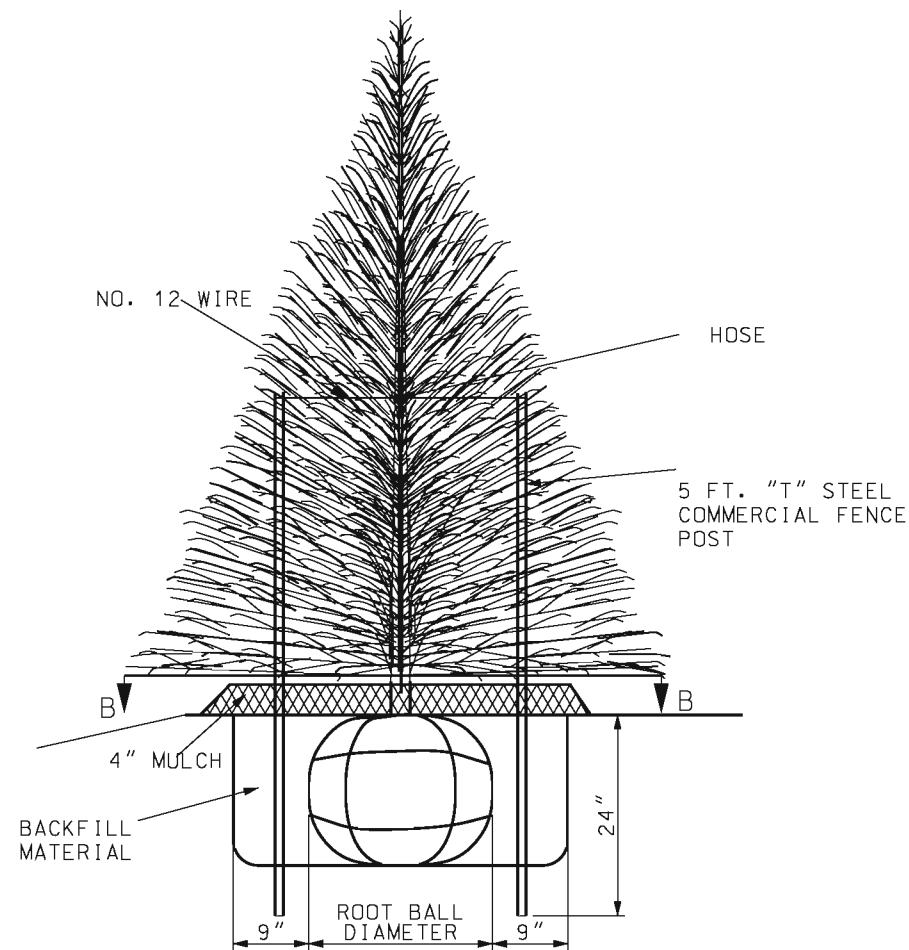
SECTION A-A



SECTION B-B



METHOD OF SUPPORTING DECIDUOUS TREES
3" CALIBER OR LARGER




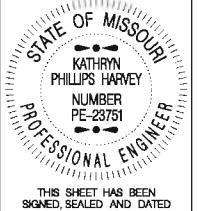
METHOD OF SUPPORTING EVERGREEN TREES
3' OR MORE IN HEIGHT

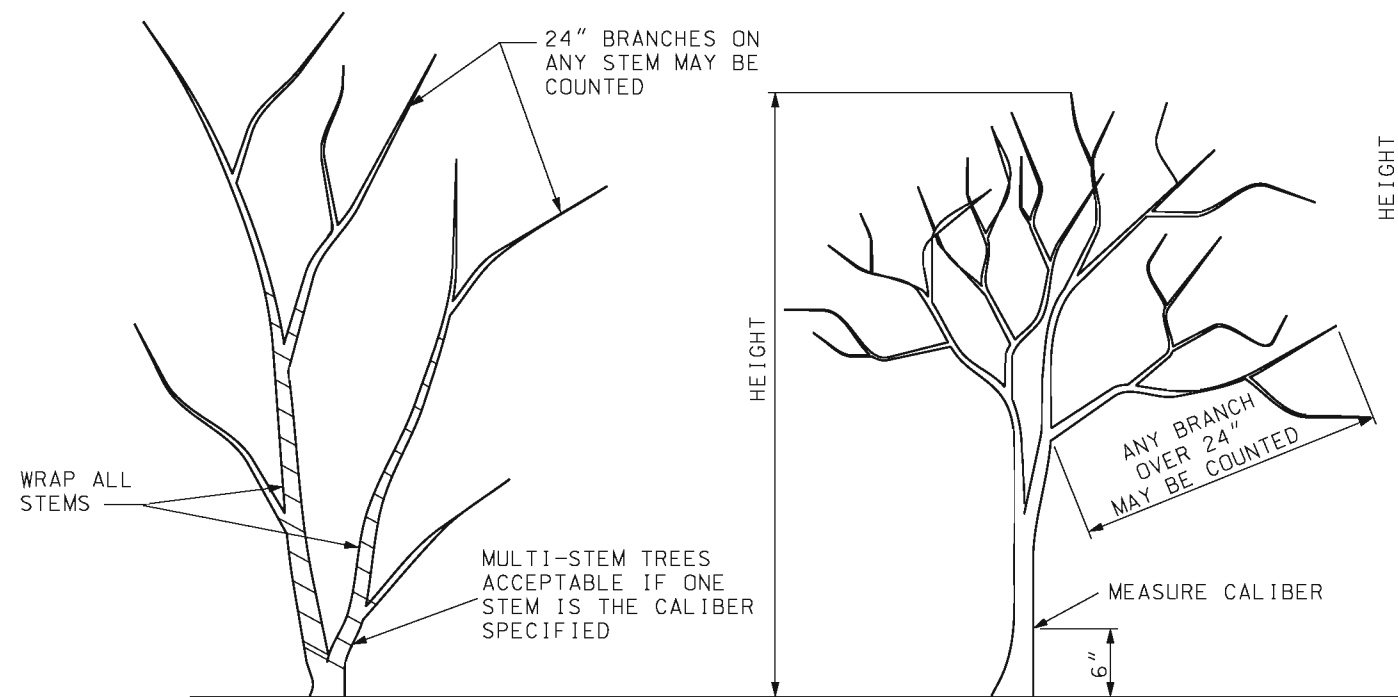
NOTES:

- TREE WRAP SHALL BE INSTALLED BEFORE BRACING.
- BRACE SHALL BE NAILED SECURELY TO POST AND BRACE BLOCK.
- BANDING SHALL BE DONE WITH A COMMERCIAL BANDING MACHINE.

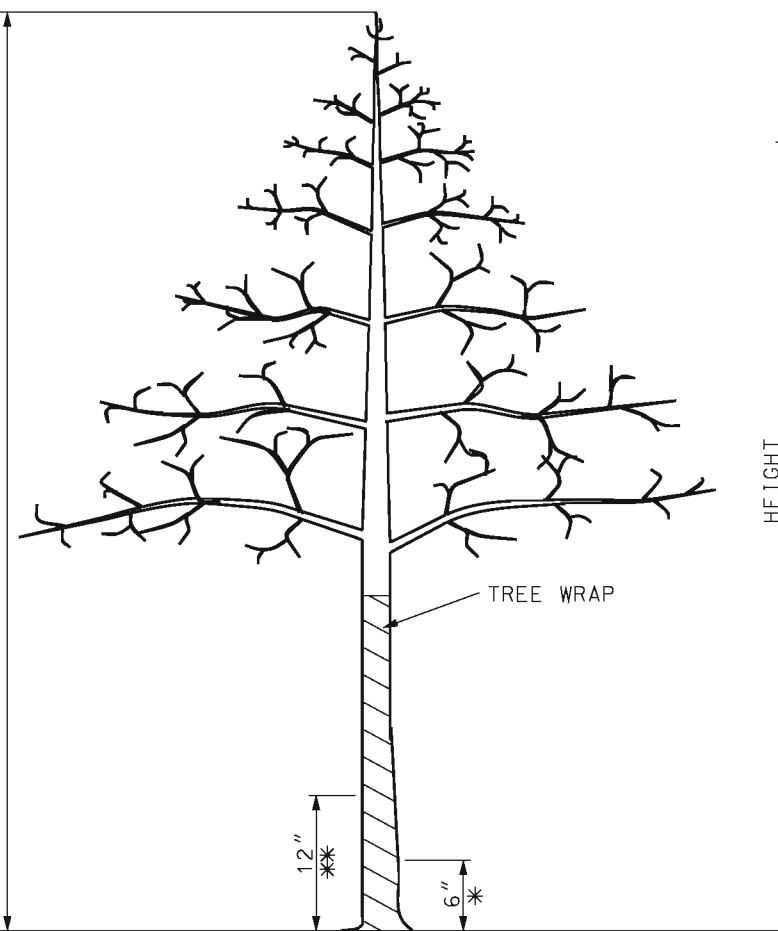
GENERAL NOTE:

ALL NUMBER MEASUREMENTS ARE NOMINAL.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TYPICAL PLANTING ILLUSTRATIONS METHOD OF SUPPORT |
| DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/26/2009 | 808.00 |
| SHEET NO. 1 OF 3 | |



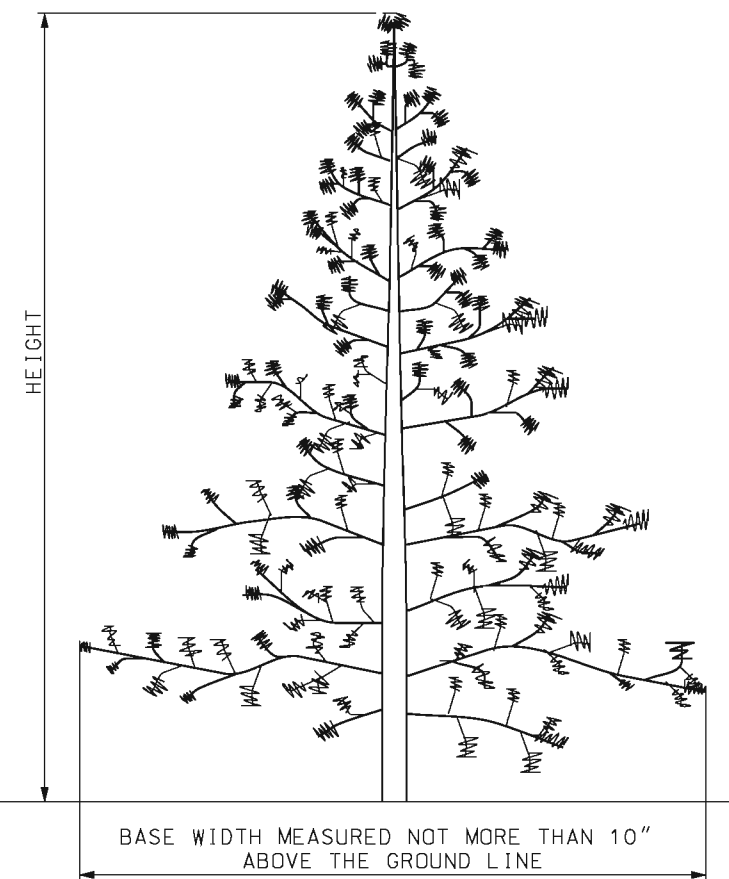
MEASUREMENT OF
SMALL TREES



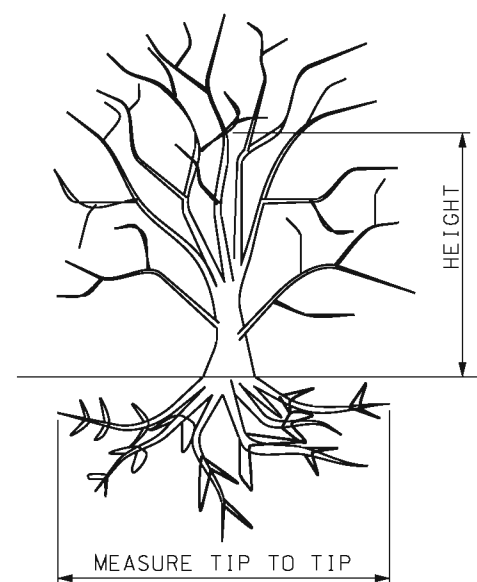
* MEASURE CALIBER FOR
TREES 4" OR LESS.

** MEASURE CALIBER FOR
TREES MORE THAN 4".

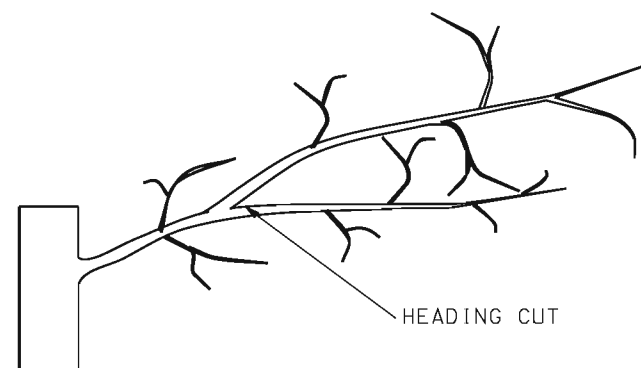
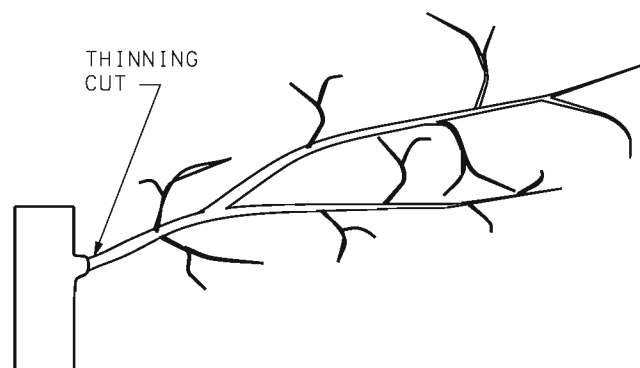
MEASUREMENT OF
LARGE TREES





MEASUREMENT OF
EVERGREEN TREES

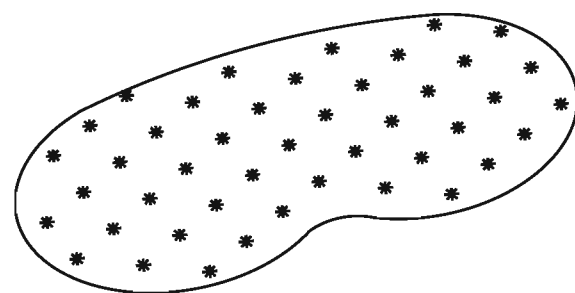
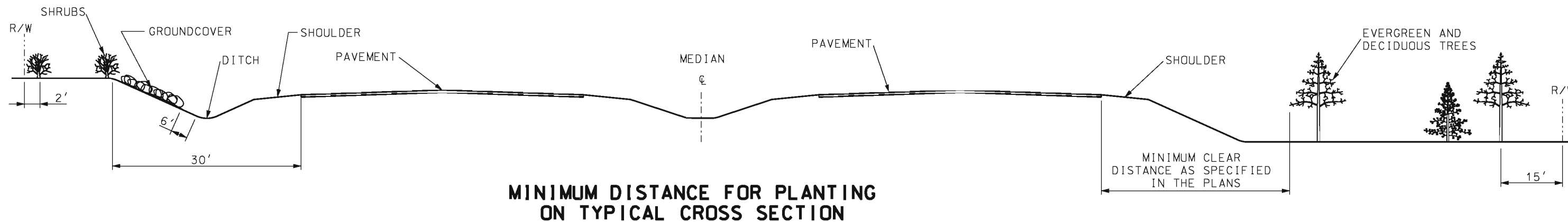


MEASUREMENT OF
DECIDUOUS SHRUBS

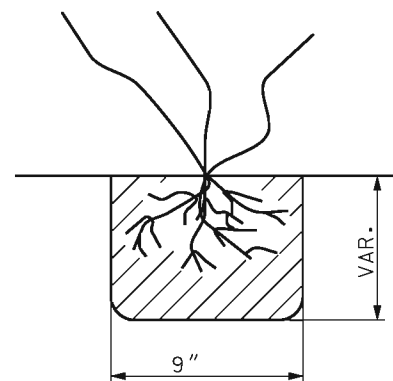


PRUNING CUTS

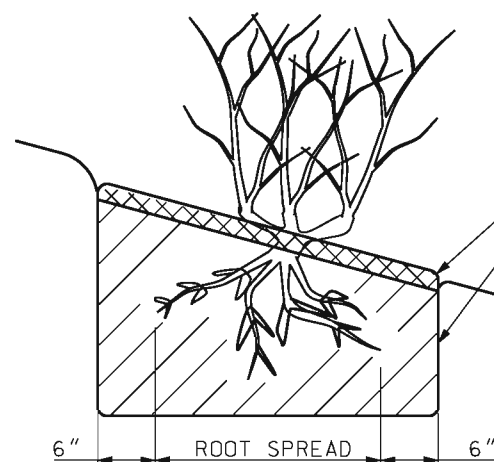
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TYPICAL PLANTING ILLUSTRATIONS MEASUREMENT AND PRUNING CUTS |
| DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/26/2009 | 808.00 |
| SHEET NO. 2 OF 3 | |



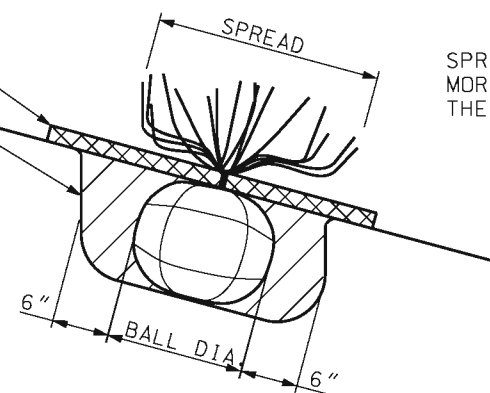
LOCATION OF SHRUBS
IN A TYPICAL PLANT BED




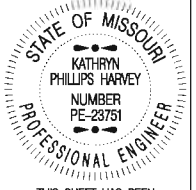
VINES AND SEEDLINGS

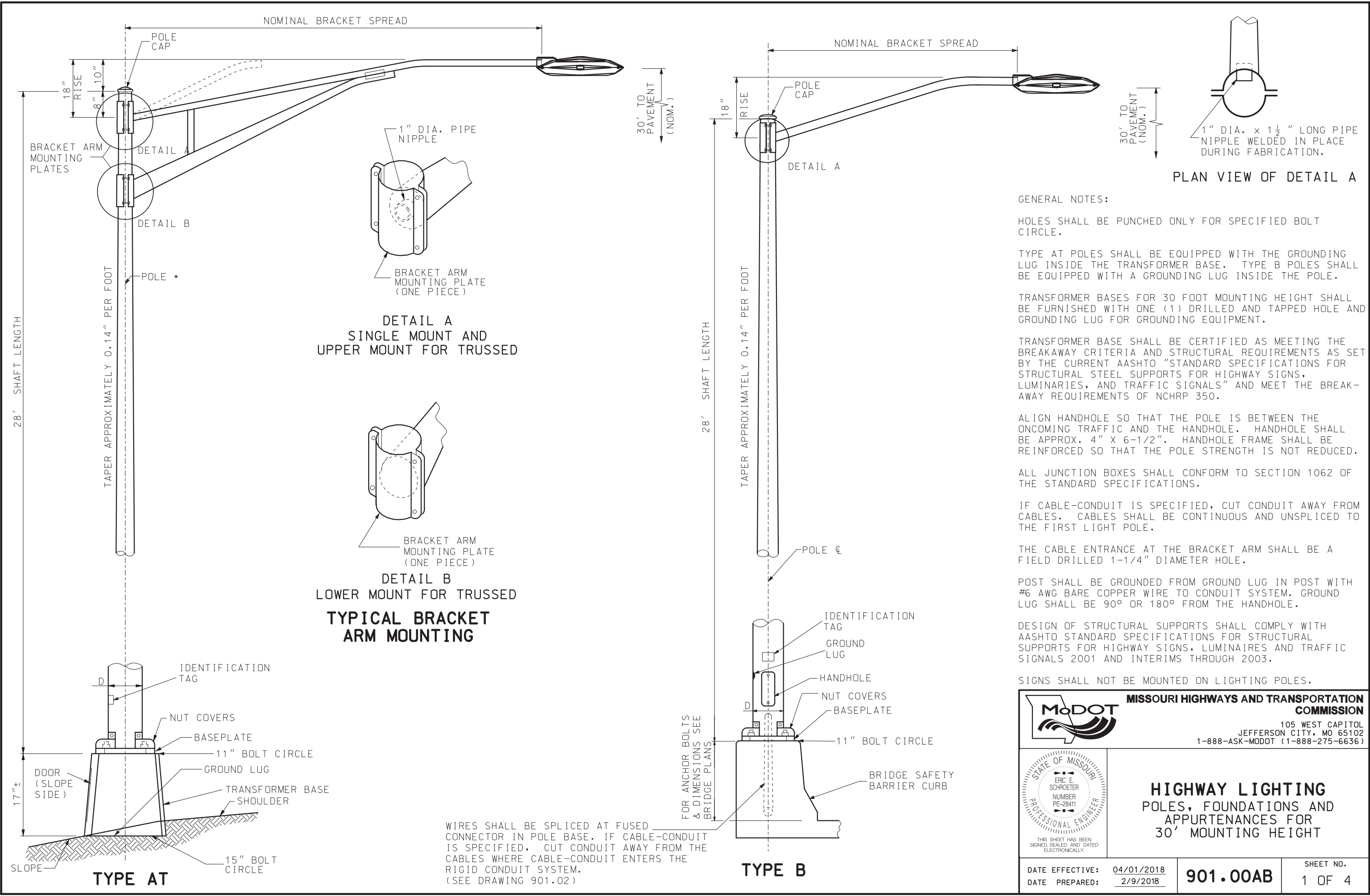


DECIDUOUS SHRUB
SLOPE PLANTING



EVERGREEN SHRUB
SLOPE PLANTING

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TYPICAL PLANTING ILLUSTRATIONS LOCATION AND SLOPE PLANTING |
| DATE EFFECTIVE: 07/01/2004 DATE PREPARED: 8/26/2009 | 808.00 |
| SHEET NO. 3 OF 3 | |



GENERAL NOTES:

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B POLES SHALL BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAK-AWAY REQUIREMENTS OF NCHRP 350.

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.



IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO THE FIRST LIGHT POLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIAMETER HOLE.

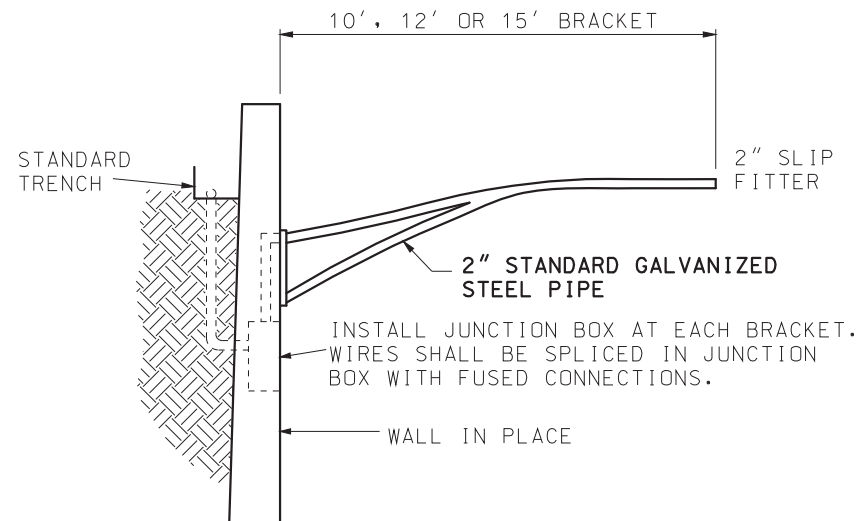
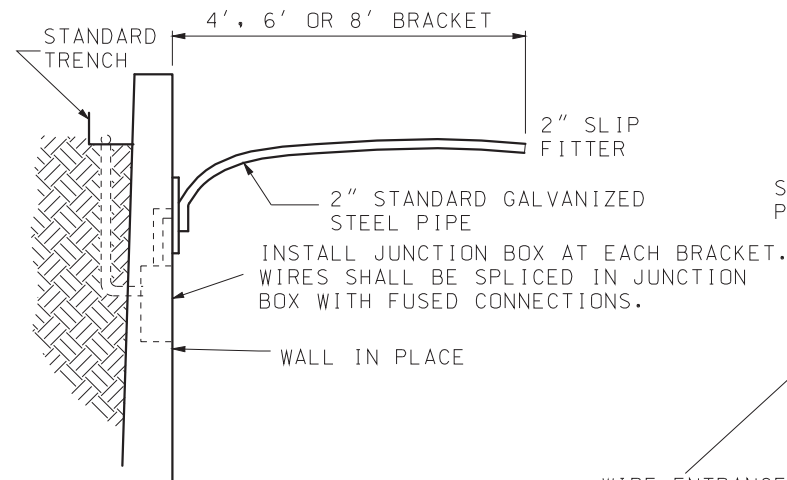
POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND INTERIMS THROUGH 2003.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

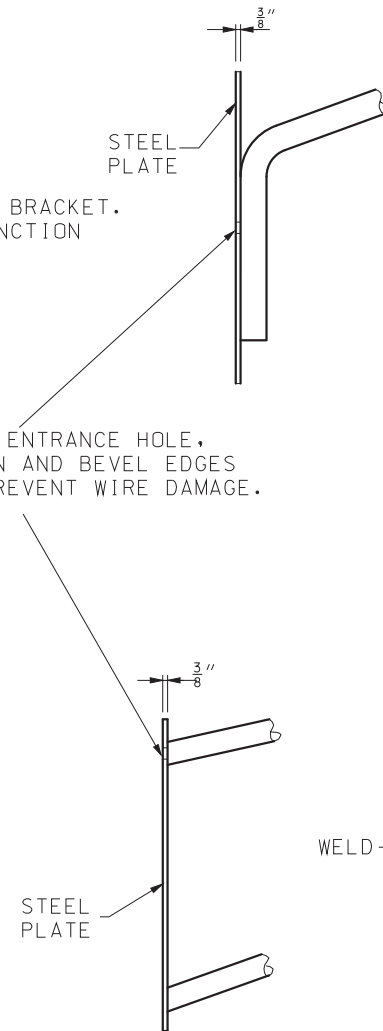
| | | |
|--|--|-----------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small> | HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT | |
| | DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | 901.00AB |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

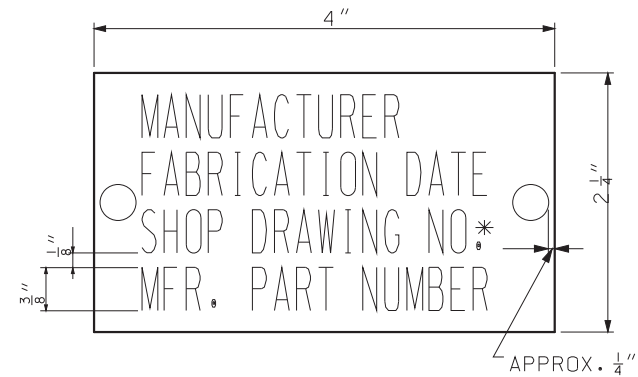
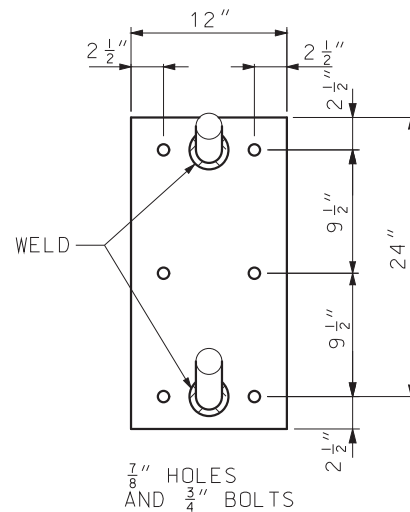
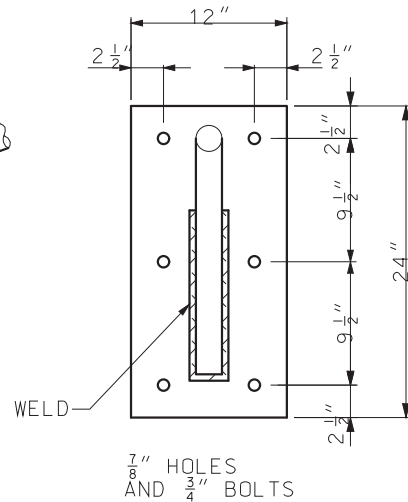


WALL BRACKETS

WIRE ENTRANCE HOLE.
CLEAN AND BEVEL EDGES
TO PREVENT WIRE DAMAGE.



FACE PLATE DETAILS



IDENTIFICATION TAG

ID TAG NOTE:
TAG SHALL BE ALUMINUM OR
STAINLESS STEEL AND ATTACHED
TO POLE USING TWO RIVETS OR
STAINLESS STEEL DRIVE SCREWS.

* INCLUDING REVISION

GENERAL NOTES:

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT
CIRCLE.

TYPE AT POLES SHALL BE EQUIPPED WITH THE GROUNDING
LUG INSIDE THE TRANSFORMER BASE. TYPE B POLES SHALL
BE EQUIPPED WITH A GROUNDING LUG INSIDE THE POLE.

TRANSFORMER BASES FOR 30 FOOT MOUNTING HEIGHT SHALL
BE FURNISHED WITH ONE (1) DRILLED AND TAPPED HOLE AND
GROUNDING LUG FOR GROUNDING EQUIPMENT.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE
BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS
SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS
FOR STRUCTURAL STEEL SUPPORTS FOR HIGHWAY SIGNS,
LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAK-
AWAY REQUIREMENTS OF NCHRP 350.

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE
ONCOMING TRAFFIC AND THE HANDHOLE. HANDHOLE SHALL
BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE
REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF
THE STANDARD SPECIFICATIONS.

IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM
CABLES. CABLES SHALL BE CONTINUOUS AND UNSPLICED TO
THE FIRST LIGHT POLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A
FIELD DRILLED 1-1/4" DIA. HOLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH
#6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND
LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.

ID TAG HOLES SHALL BE DRILLED INTO POLE PRIOR TO
GALVANIZING.

| LED LUMINAIRES | | | | |
|---|-------------|-----------|----------------------|---|
| FUSE RATING | DESIGNATION | MAX. WATT | DISTRIBUTION TYPE | BACKLIGHT-UPLIGHT-GLARE (BUG) RATING |
| 3 A | LED-A | 103 | III | B2-U0-G2 |
| LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED ON PLANS. | | | | |

| TYPE AT POLE | | | | |
|---------------------------------|----------------|------------------------------|---------------------------|-------|
| BRACKET SPREAD | | 4' - 10' | 12' | 15' |
| MAX. LUMINAIRE WEIGHT | | 75 LB | 71 LB | 66 LB |
| MAX. PROJECTED AREA | | 3.3 SQ. FT. | | |
| SINGLE AND TRUSSED BRACKET ARMS | | | | |
| LOCATION | LENGTH POLE | BRACKET SPREAD | TRANS. BASE BOLT CIRC. | D |
| SHOULDER | 28' | 4', 6', 8', 10', 12', 15' | 15" | 8" |

| TYPE B POLE | | | | |
|-------------------------------|----------------|-------------------|-------|---------------------|
| BRACKET SPREAD | | 4' | 6' | 8' |
| MAX. LUMINAIRE WEIGHT | | 75 LB | 75 LB | 54 LB |
| MAX. PROJECTED AREA | | 3.3 SQ. FT. | | |
| SINGLE BRACKET ARM | | | | |
| LOCATION | LENGTH POLE | BRACKET SPREAD | D | ANCHOR BOLT DIA. |
| BRIDGE SAFETY BARRIER CURB | 28' | 4', 6' 8' | 8" | 1" |



**MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION**

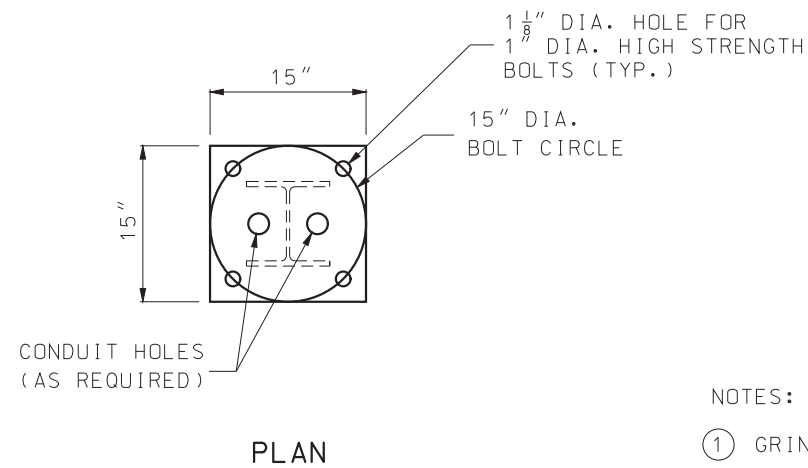
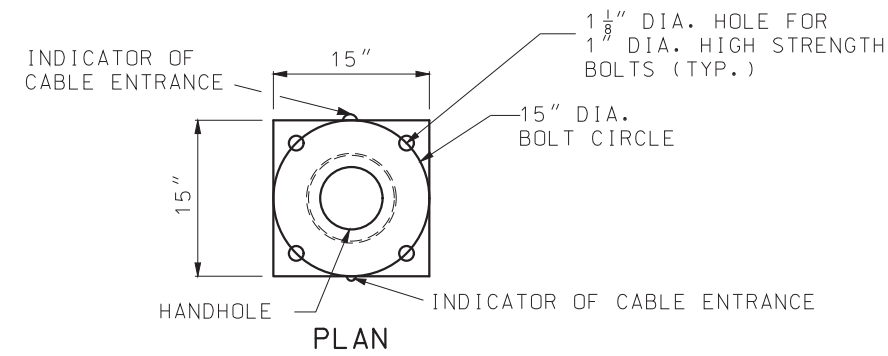
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



**HIGHWAY LIGHTING
POLES, FOUNDATIONS AND
APPURTENANCES FOR
30' MOUNTING HEIGHT**

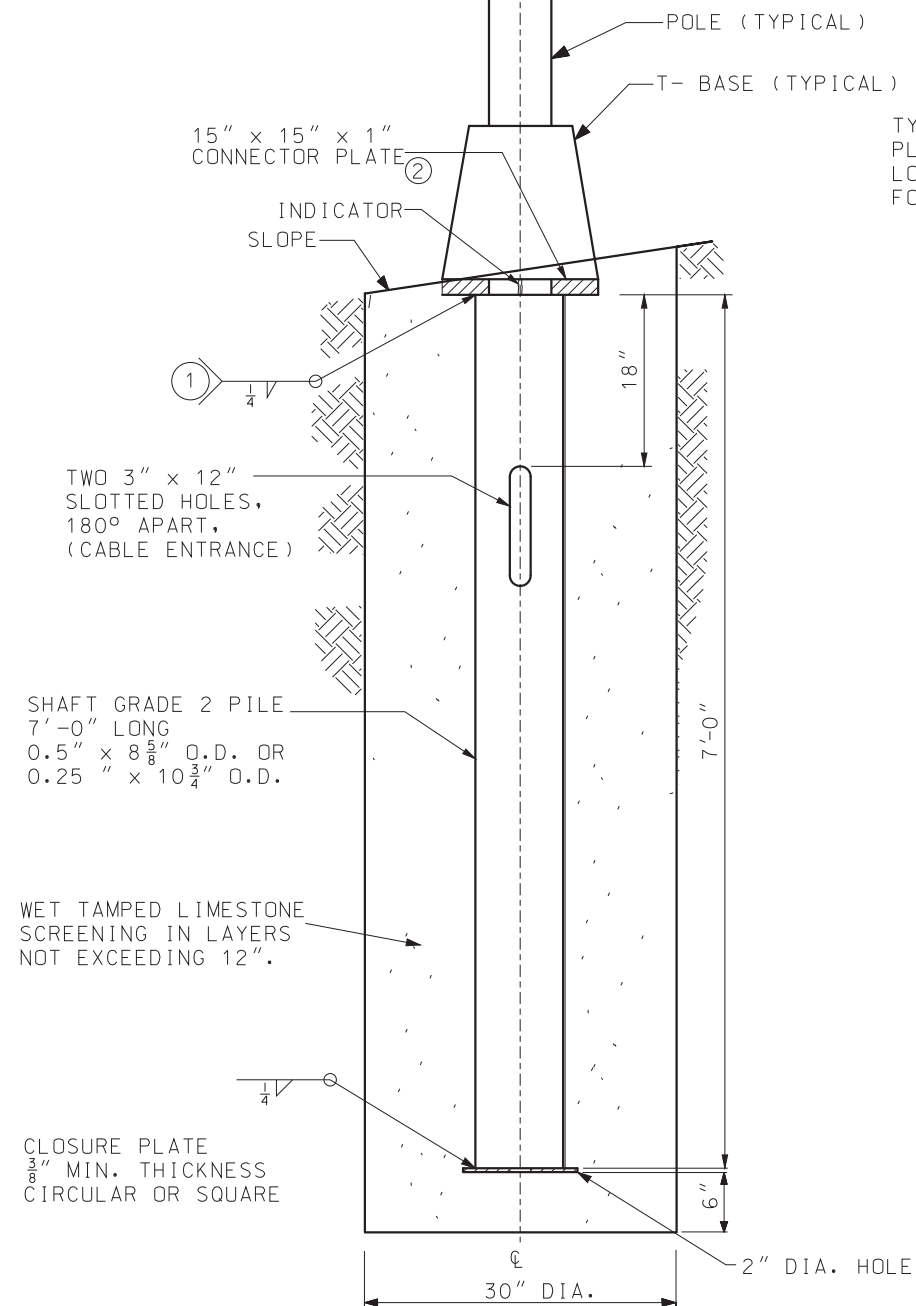
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|-----------------|------------|-----------------|---------------------|
| DATE EFFECTIVE: | 04/01/2018 | 901.00AB | SHEET NO. 2 OF 4 |
| DATE PREPARED: | 2/9/2018 | | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

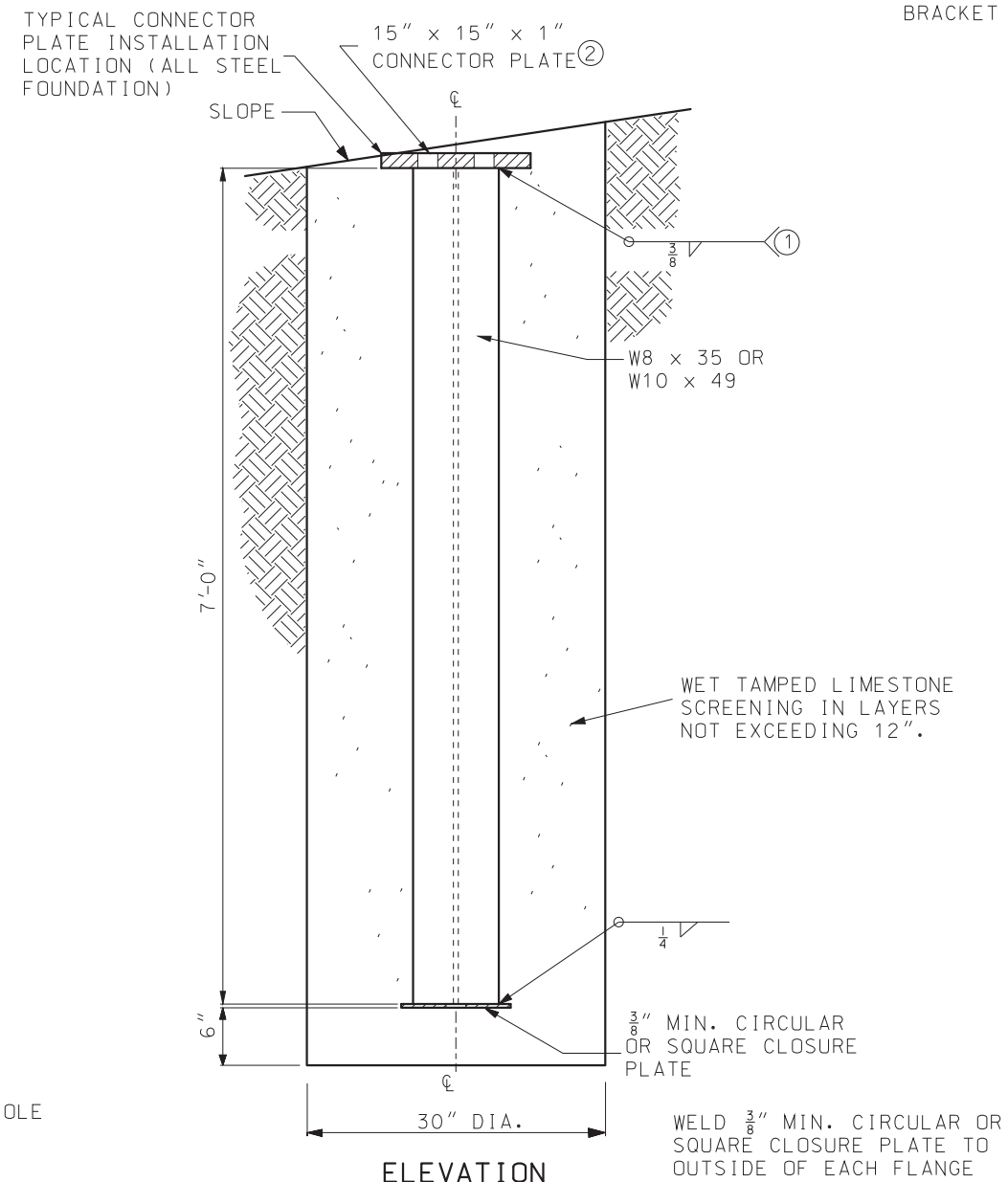


NOTES:

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.



**DETAILS OF CIRCULAR
STEEL PILE FOUNDATION**



**DETAILS OF STEEL
"H" PILE FOUNDATION**

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

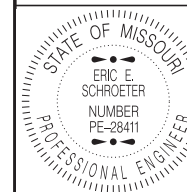
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



**MISSOURI HIGHWAYS AND TRANSPORTATION
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JEFFERSON CITY, MO 65102
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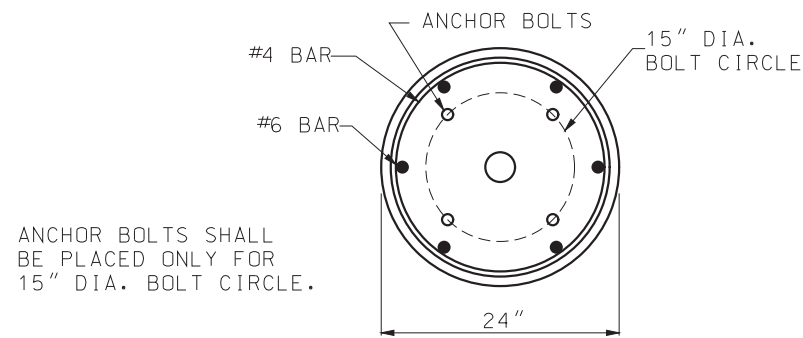
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

**HIGHWAY LIGHTING
POLES, FOUNDATIONS AND
APPURTENANCES FOR
30' MOUNTING HEIGHT**

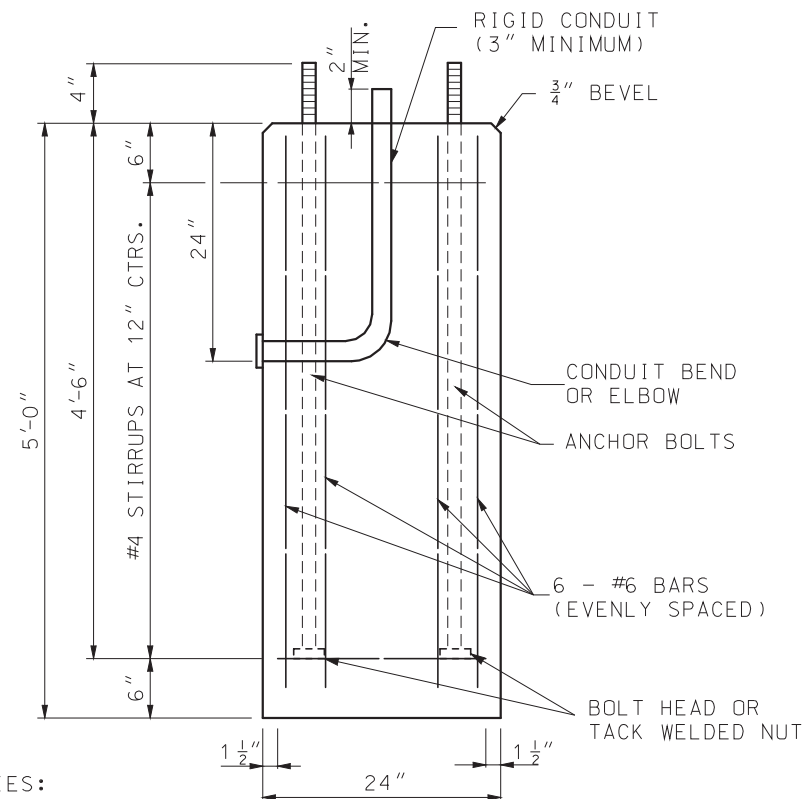
DATE EFFECTIVE: 12/01/2013
DATE PREPARED: 2/9/2018

901.00AB

SHEET NO.
3 OF 4

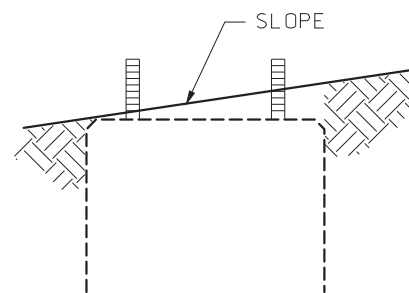


PLAN

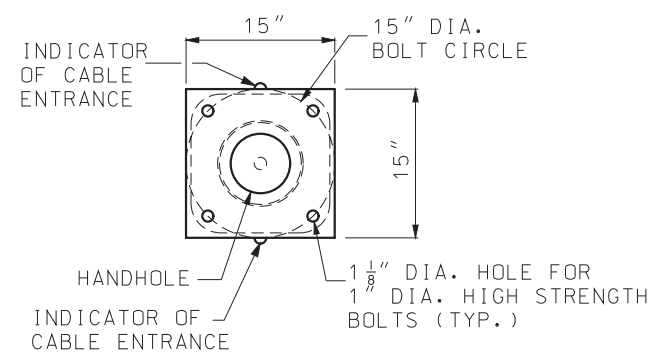


QUANTITIES:
CONC. = 0.58 CU. YD.
REIN. = 64 LBS.

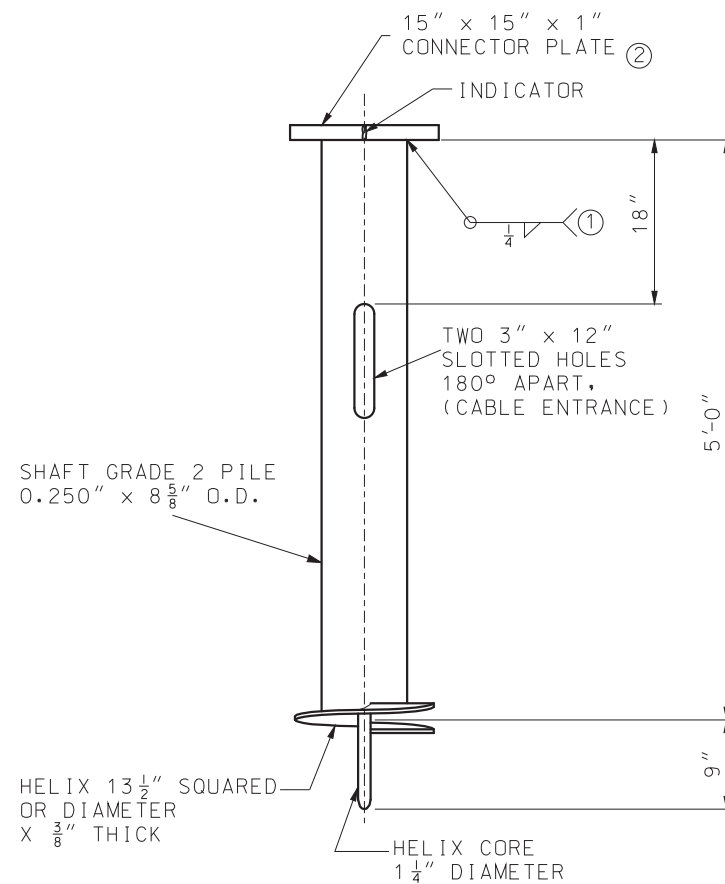
ELEVATION
DETAILS OF CONCRETE
FOUNDATION ③



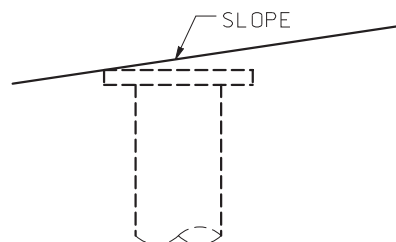
CONCRETE FOUNDATION
EMBEDMENT



PLAN



ELEVATION
DETAILS OF SCREW
ANCHOR FOUNDATION



SCREW ANCHOR
EMBEDMENT

DRIVE HOLES WILL BE PERMITTED PROVIDED THAT THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.

NOTES:

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- ③ AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATION MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.

GENERAL NOTES:

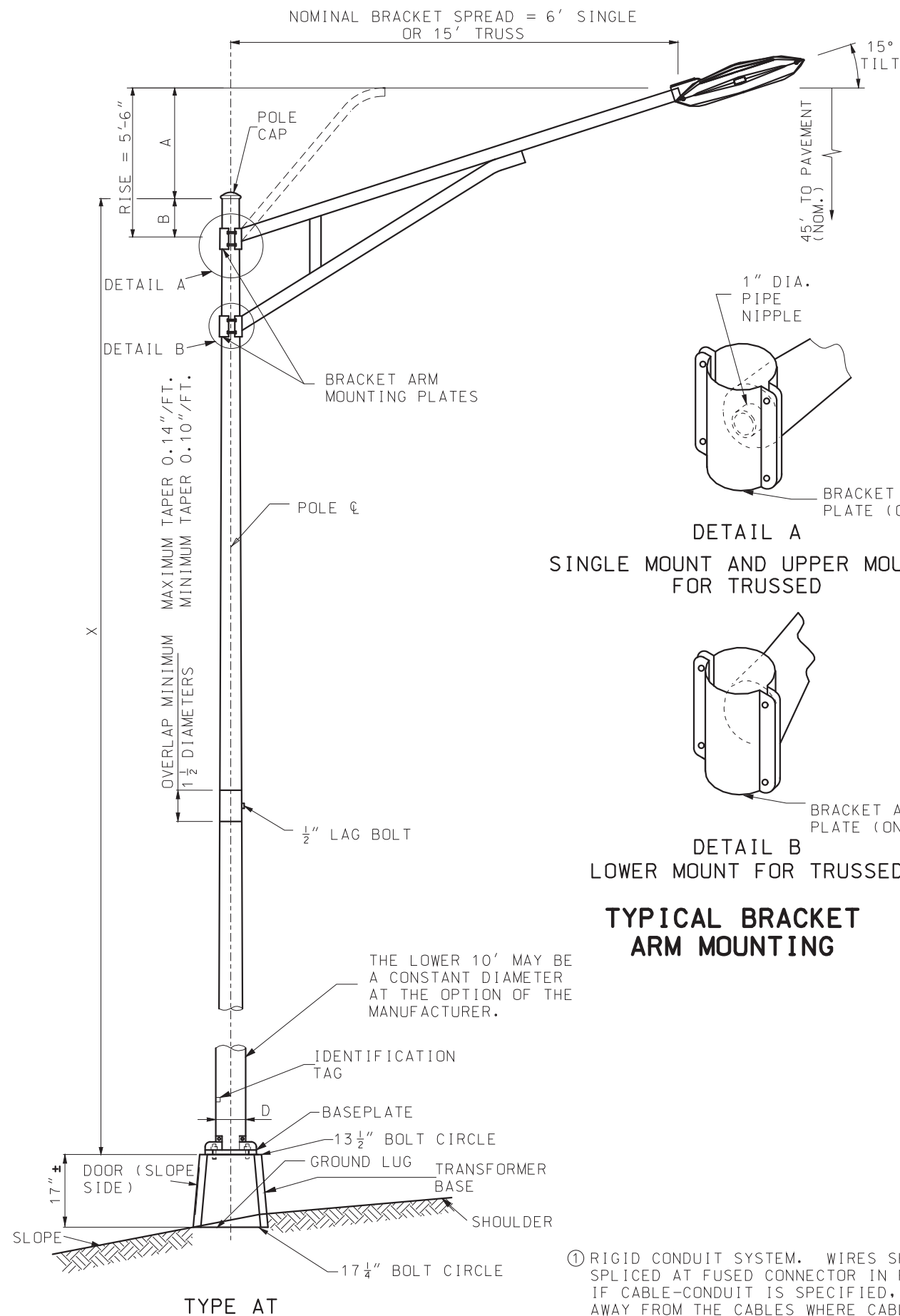
ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL CONNECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1" DIA. HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

| | |
|--|--|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 30' MOUNTING HEIGHT |
| DATE EFFECTIVE: 12/01/2013 DATE PREPARED: 2/9/2018 | 901.00AB |
| SHEET NO. 4 OF 4 | |

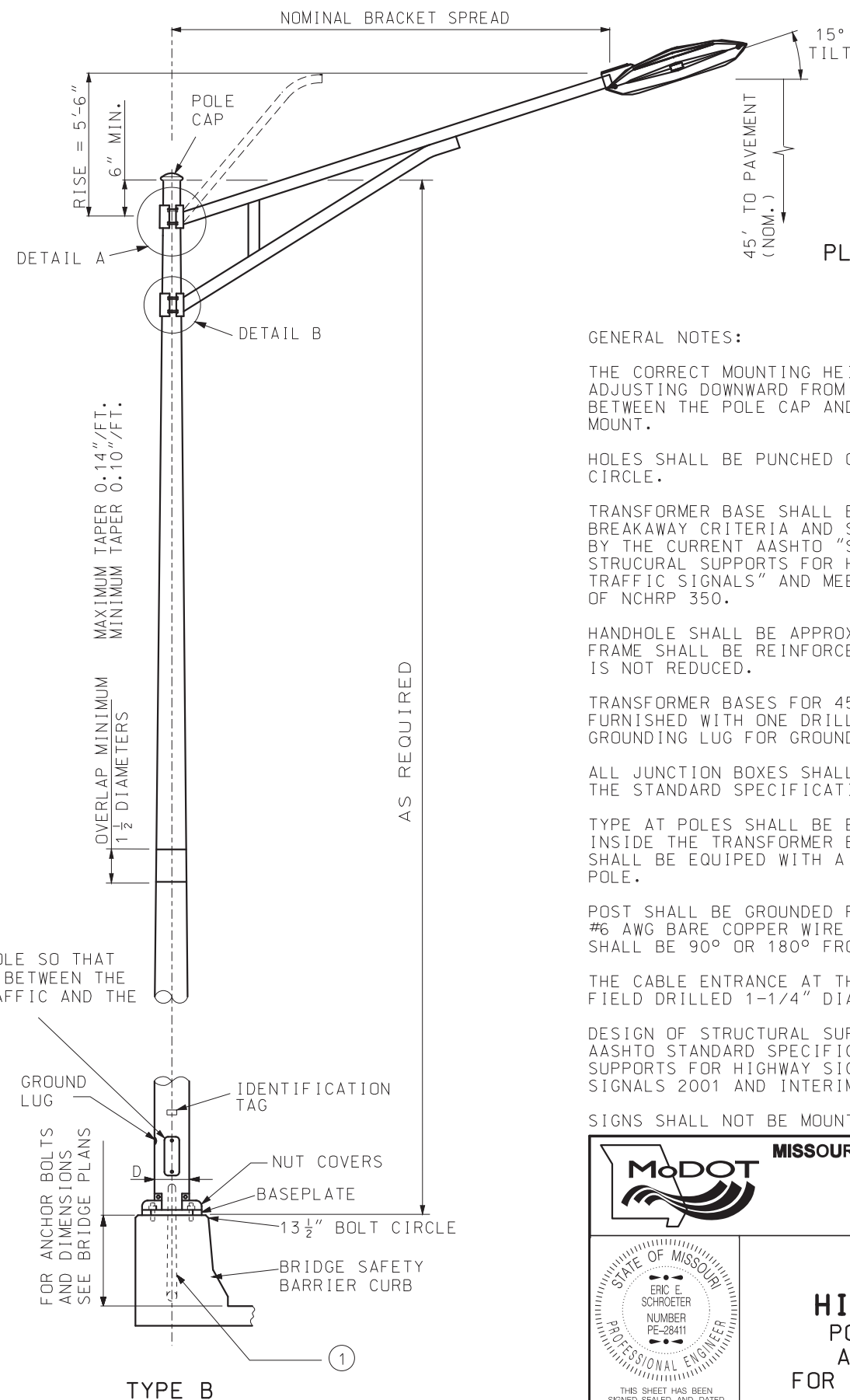


SINGLE MOUNT AND UPPER MOUNT FOR TRUSSED

TYPICAL BRACKET ARM MOUNTING

① RIGID CONDUIT SYSTEM. WIRES SHALL BE SPLICED AT FUSED CONNECTOR IN POLE BASE. IF CABLE-CONDUIT IS SPECIFIED, CUT CONDUIT AWAY FROM THE CABLES WHERE CABLE-CONDUIT ENTERS THE RIGID CONDUIT SYSTEM. (SEE DRAWING 901.02)

ALIGN HANDHOLE SO THAT THE POLE IS BETWEEN THE ONCOMING TRAFFIC AND THE HANDHOLE.



PLAN VIEW OF DETAIL A

1" DIA. x 1 1/2" LONG PIPE NIPPLE WELDED IN PLACE DURING FABRICATION.

GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6-1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.

TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.



TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

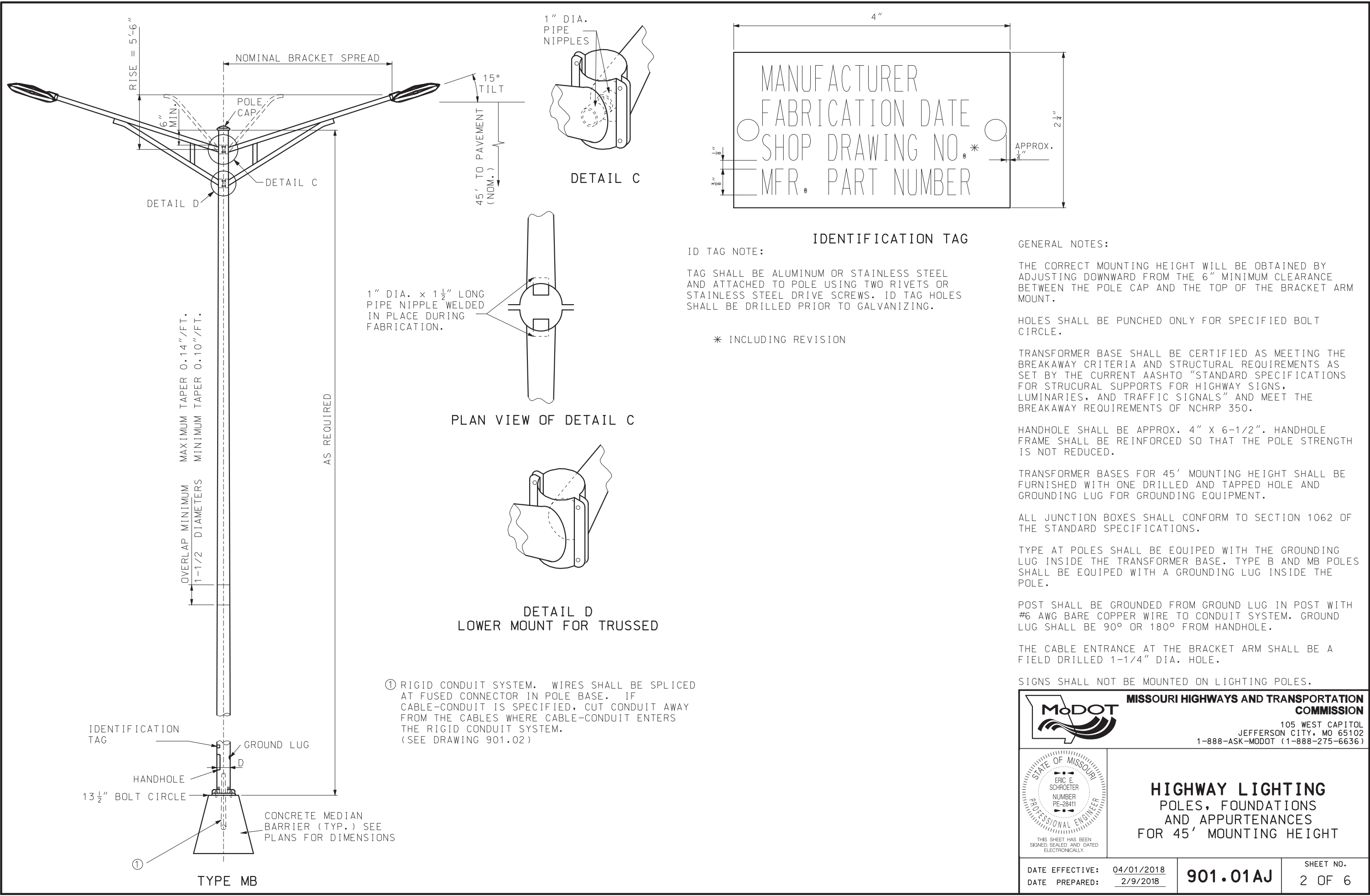
THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1-1/4" DIA. HOLE.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND INTERIMS THROUGH 2003.

SIGNS SHALL NOT BE MOUNTED ON LIGHTING POLES.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT</p> |
| DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | <p>901.01AJ</p> |
| SHEET NO. 1 OF 6 | |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| TYPE AT POLE | | | | |
|------------------------|-----|-------------|---------|-----------------|
| BRACKET SPREAD | | 6' OR 15' | | |
| MAX. LUMINAIRE WEIGHT | | 60 LB | | |
| MAX. PROJECTED AREA | | 3.3 SQ. FT. | | |
| AT-45 DESIGN NO. | X | A | B | D* (NOMINAL) |
| 1 | 50' | VAR. | 6" MIN. | 10" |
| 2 | 45' | VAR. | 6" MIN. | 10" |
| 3 | 40' | VAR. | 6" MIN. | 10" |
| 4 | 35' | VAR. | 6" MIN. | 10" |
| 5 | 30' | VAR. | 6" MIN. | 10" |

* THE MINIMUM ALTERNATE DIAMETER SHALL BE 10" FOR A 50' POLE, 9-1/2" FOR A 45' POLE, 9" FOR A 40' POLE, 8-1/2" FOR A 35' POLE AND 8" FOR A 30' POLE.

| TYPE B POLE | | | |
|-------------------------------|----------------|-------------|---------------------|
| BRACKET SPREAD | | 6' OR 15' | |
| MAX. LUMINAIRE WEIGHT | | 60 LB | |
| MAX. PROJECTED AREA | | 3.3 SQ. FT. | |
| SINGLE BRACKET ARM | | | |
| LOCATION | BRACKET SPREAD | D NOM. | ANCHOR BOLT DIA. |
| BRIDGE SAFETY BARRIER CURB | 6' | 10" | 1-1/4" |
| TRUSSED BRACKET ARM | | | |
| LOCATION | BRACKET SPREAD | D NOM. | ANCHOR BOLT DIA. |
| BRIDGE SAFETY BARRIER CURB | 15' | 10" | 1-1/4" |

| LED LUMINAIRES | | | | |
|---|-------------|-----------|----------------------|---|
| FUSE RATING | DESIGNATION | MAX. WATT | DISTRIBUTION TYPE | BACKLIGHT-UPLIGHT-GLARE (BUG) RATING |
| 3 A | LED-A | 103 | III | B2-U0-G2 |
| 5 A | LED-B | 170 | III | B3-U0-G3 |
| 7 A | LED-C | 275 | III | B3-U0-G3 |
| LUMINAIRE PER CHART UNLESS OTHERWISE SPECIFIED ON PLANS. | | | | |

GENERAL NOTES:

THE CORRECT MOUNTING HEIGHT WILL BE OBTAINED BY ADJUSTING DOWNWARD FROM THE 6" MINIMUM CLEARANCE BETWEEN THE POLE CAP AND THE TOP OF THE BRACKET ARM MOUNT.

HOLES SHALL BE PUNCHED ONLY FOR SPECIFIED BOLT CIRCLE.

TRANSFORMER BASE SHALL BE CERTIFIED AS MEETING THE BREAKAWAY CRITERIA AND STRUCTURAL REQUIREMENTS AS SET BY THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR STRUCURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS" AND MEET THE BREAKAWAY REQUIREMENTS OF NCHRP 350.

HANDHOLE SHALL BE APPROX. 4" X 6 1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.


TRANSFORMER BASES FOR 45' MOUNTING HEIGHT SHALL BE FURNISHED WITH ONE DRILLED AND TAPPED HOLE AND GROUNDING LUG FOR GROUNDING EQUIPMENT.

ALL JUNCTION BOXES SHALL CONFORM TO SECTION 1062 OF THE STANDARD SPECIFICATIONS.

TYPE AT POLES SHALL BE EQUIPED WITH THE GROUNDING LUG INSIDE THE TRANSFORMER BASE. TYPE B AND MB POLES SHALL BE EQUIPED WITH A GROUNDING LUG INSIDE THE POLE.

POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH #6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM HANDHOLE.

THE CABLE ENTRANCE AT THE BRACKET ARM SHALL BE A FIELD DRILLED 1 1/4" DIA. HOLE.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

ERIC E. SCHROETER

NUMBER PE-28411

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

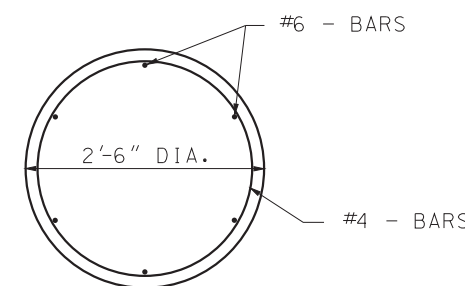
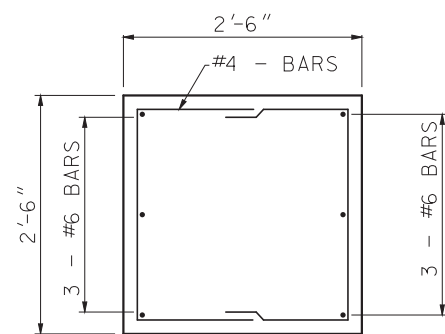
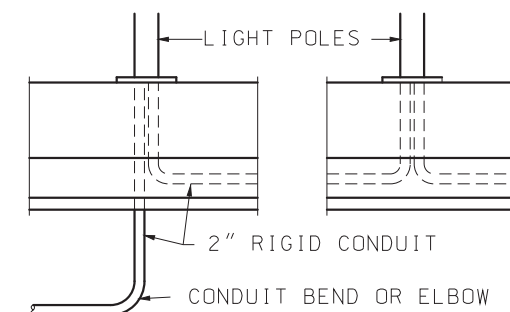
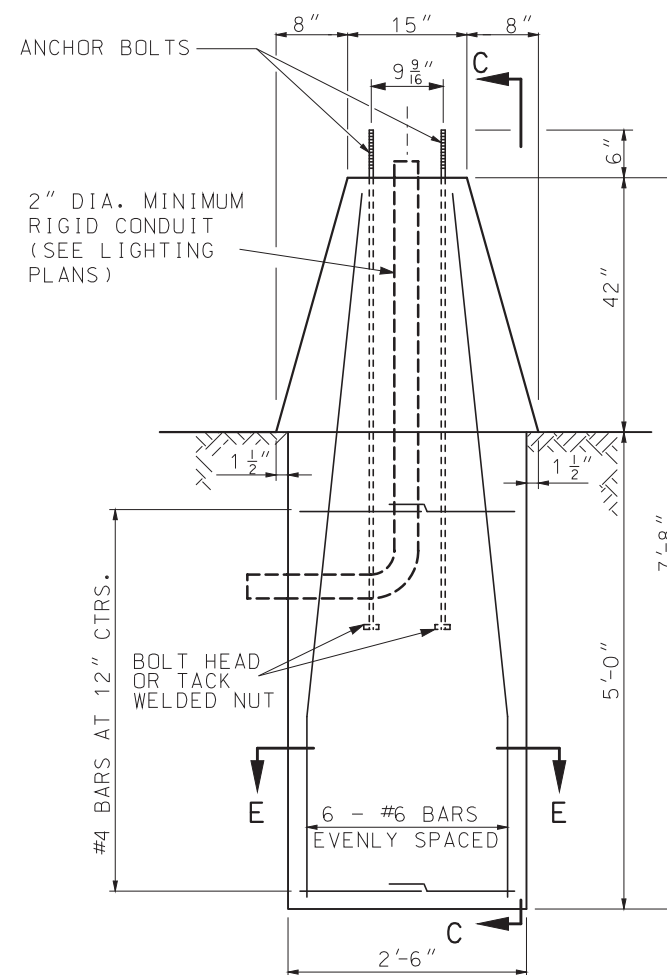
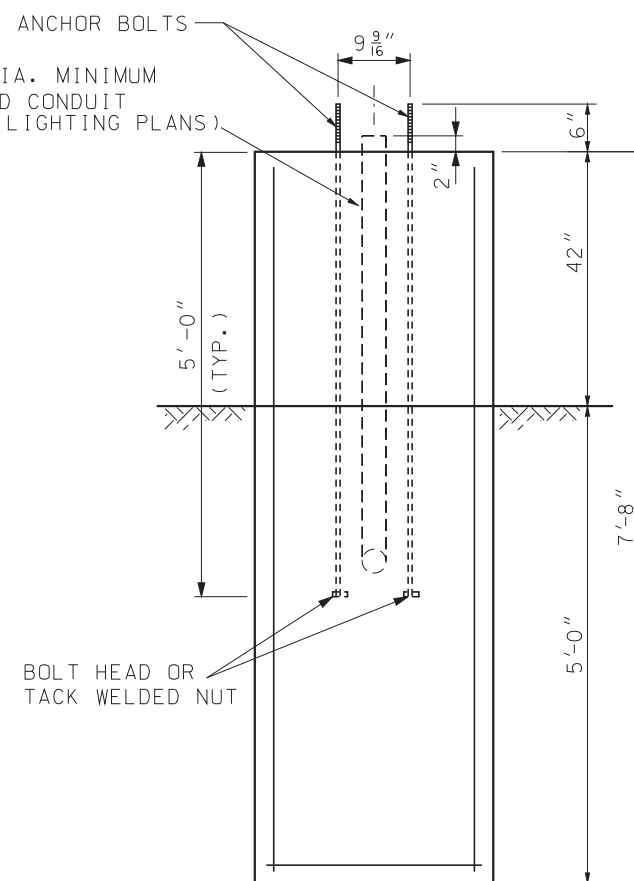
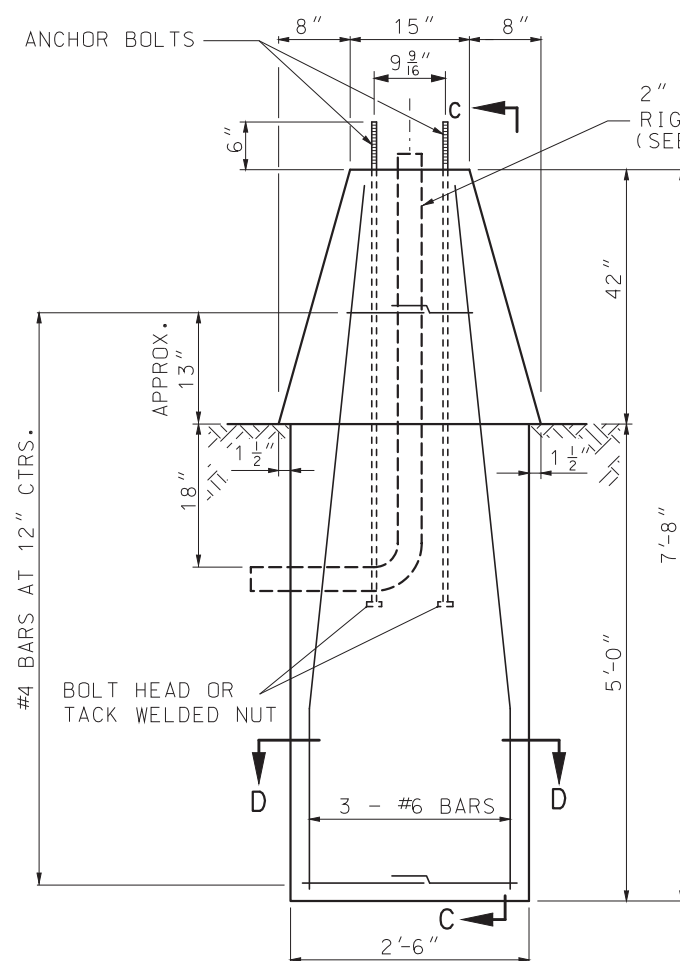
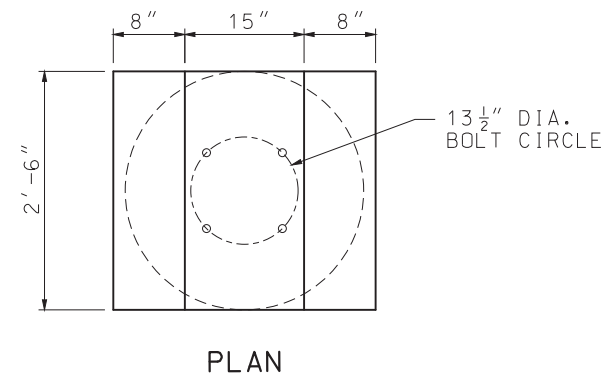
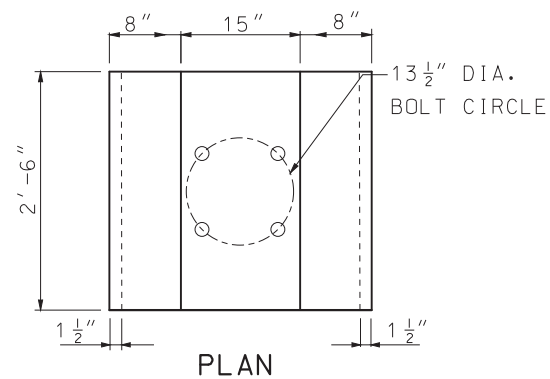
HIGHWAY LIGHTING
POLES, FOUNDATIONS
AND APPURTENANCES
FOR 45' MOUNTING HEIGHT

DATE EFFECTIVE: 04/01/2018
DATE PREPARED: 2/9/2018

901.01AJ

SHEET NO.
3 OF 6

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.




CONCRETE MEDIAN BARRIER AND FOUNDATION DESIGN FOR TYPE MB LIGHT POLE

GENERAL NOTES:

ALL FOUNDATIONS SHALL INCLUDE 4 ANCHOR BOLTS AND NUTS PLACED AS SHOWN.

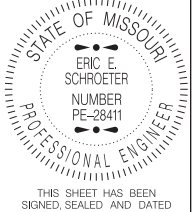
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

TOUNGE AND GROOVE REQUIRED ON MEDIAN BARRIER SECTION FOR TYPE MB POLES WHEN ADJACENT MEDIAN BARRIER IS PRECAST, FOR DETAILS, SEE STANDARD PLANS.



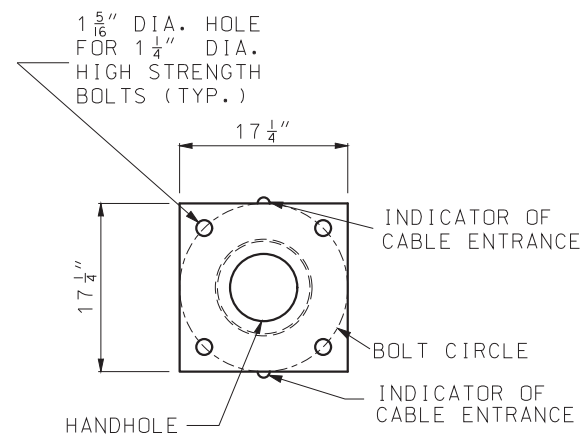
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

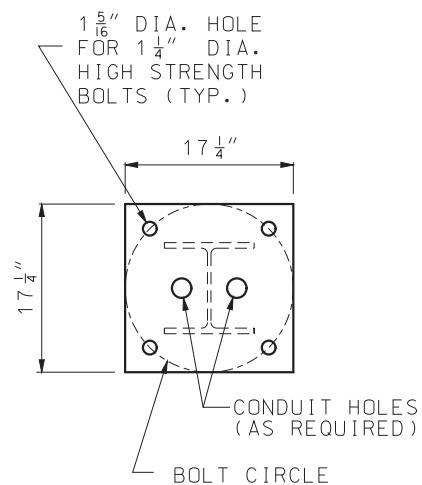


**HIGHWAY LIGHTING
POLES, FOUNDATIONS
AND APPURTENANCES
FOR 45' MOUNTING HEIGHT**

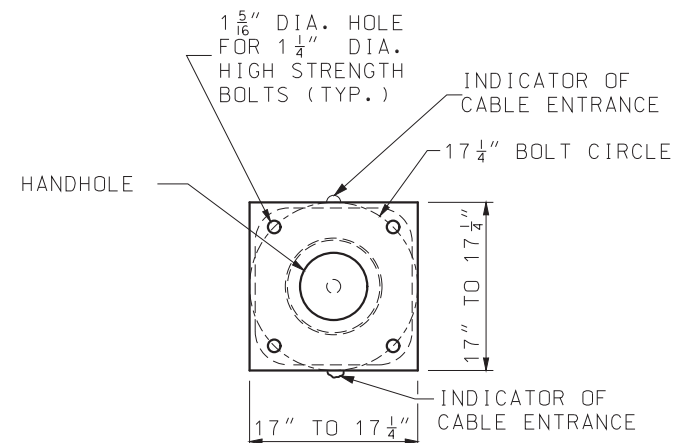
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| DATE PREPARED: | 2/9/2018 | | |



PLAN

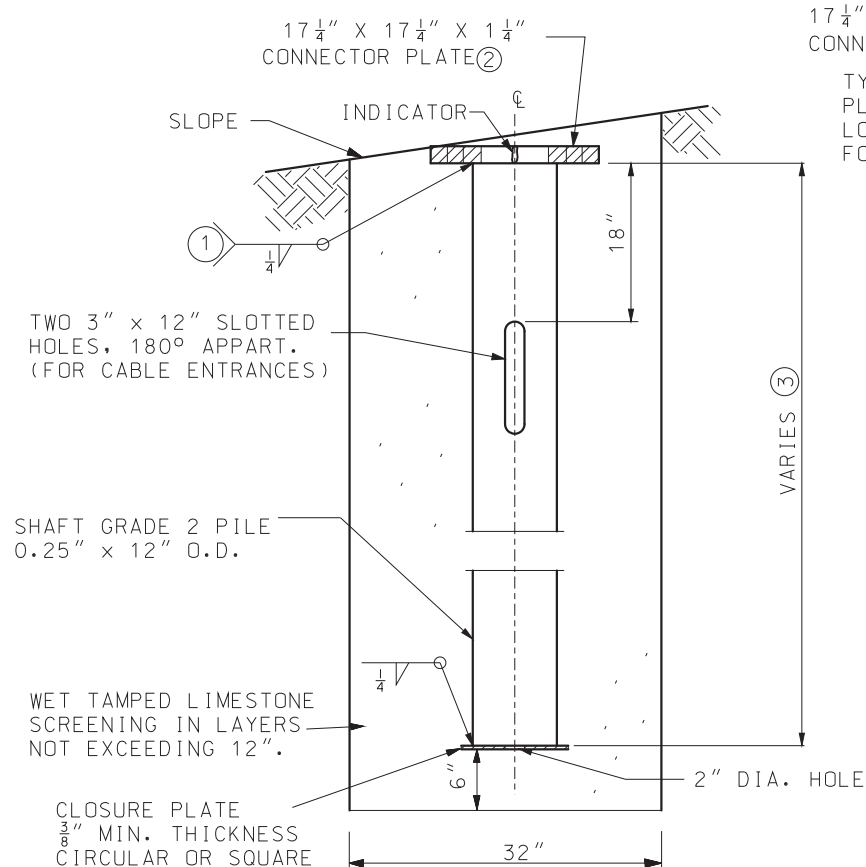


PLAN

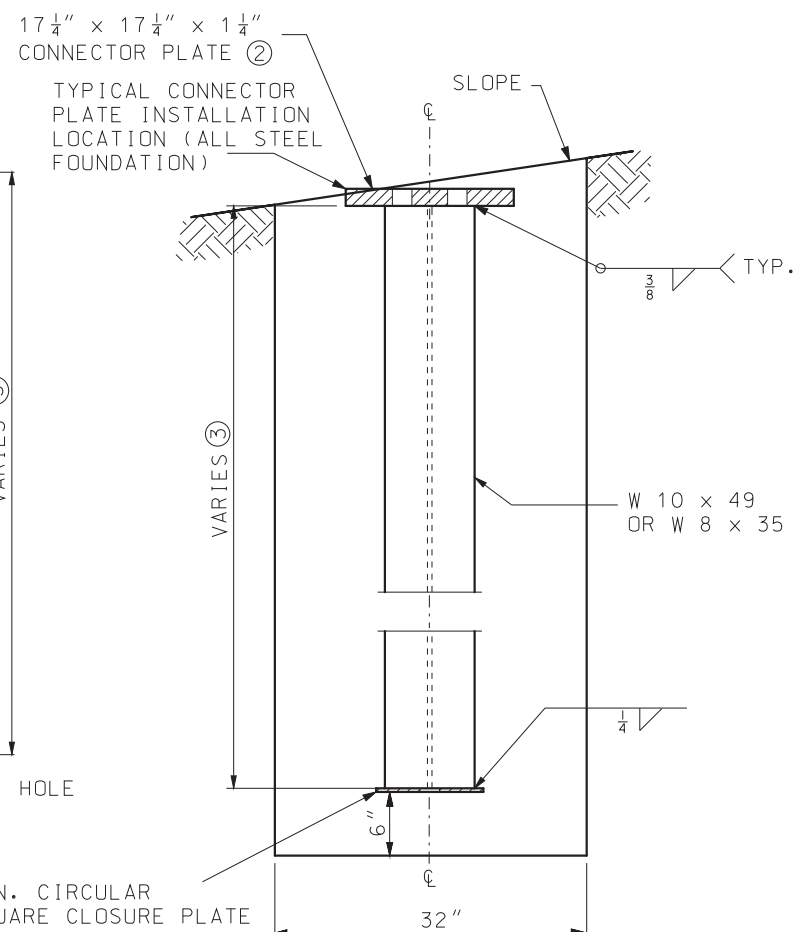


PLAN

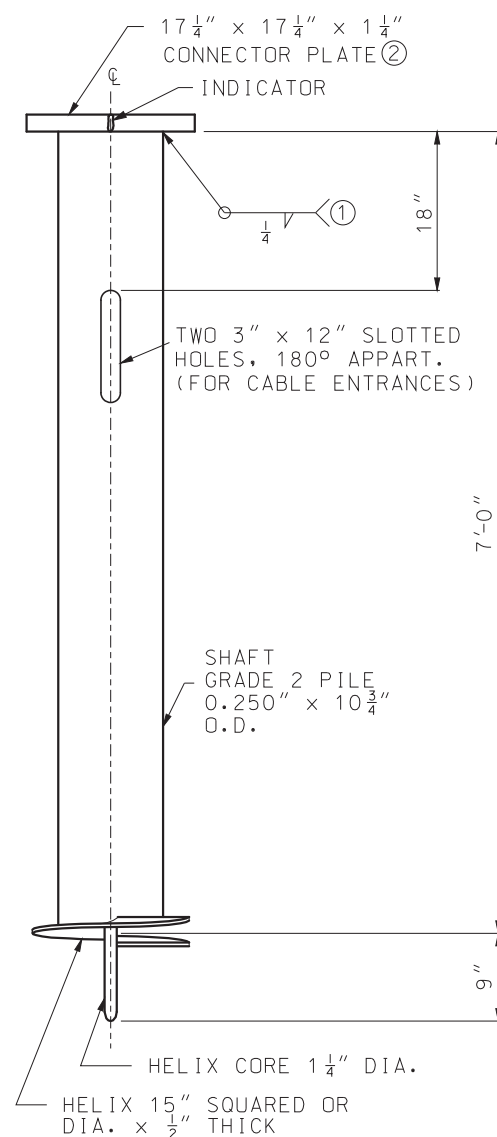
NOTE:
DRIVE HOLES WILL BE PERMITTED PROVIDED THEY DO NOT CONFLICT WITH OR COMPROMISE THE STRUCTURAL INTEGRITY OF THE PLATE, THE WELD BETWEEN THE PLATE AND SHAFT, OR THE BOLT HOLES.



ELEVATION
DETAILS OF CIRCULAR
STEEL PILE FOUNDATION



ELEVATION
DETAILS OF STEEL "H"
PILE FOUNDATION



ELEVATION
DETAILS OF
SCREW ANCHOR FOUNDATION

- ① GRIND WELD AS NECESSARY TO CLEAR BOLT HEAD.
- ② FOUNDATIONS SHALL BE INSTALLED SO THAT CONNECTOR PLATES ARE LEVEL PERPENDICULAR TO THE BRACKET ARM AND SLOPED FOR POLE RAKING PARALLEL TO THE BRACKET ARM.
- ③ PILE LENGTHS FOR STEEL PILE FOUNDATIONS:

| AT-45 DESIGN NO. | PILE LENGTH |
|---------------------|-------------|
| 4 & 5 | 8'-0" |
| 2 & 3 | 9'-0" |
| 1 | 10'-0" |

GENERAL NOTES:


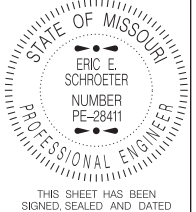
ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE 17 1/4".

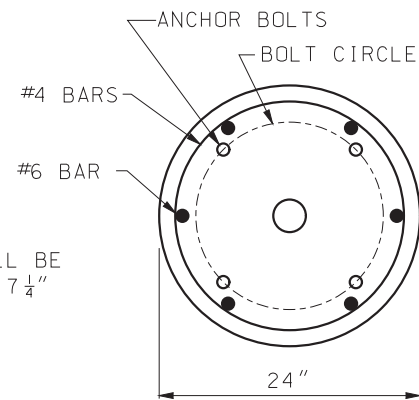
ALL CONECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

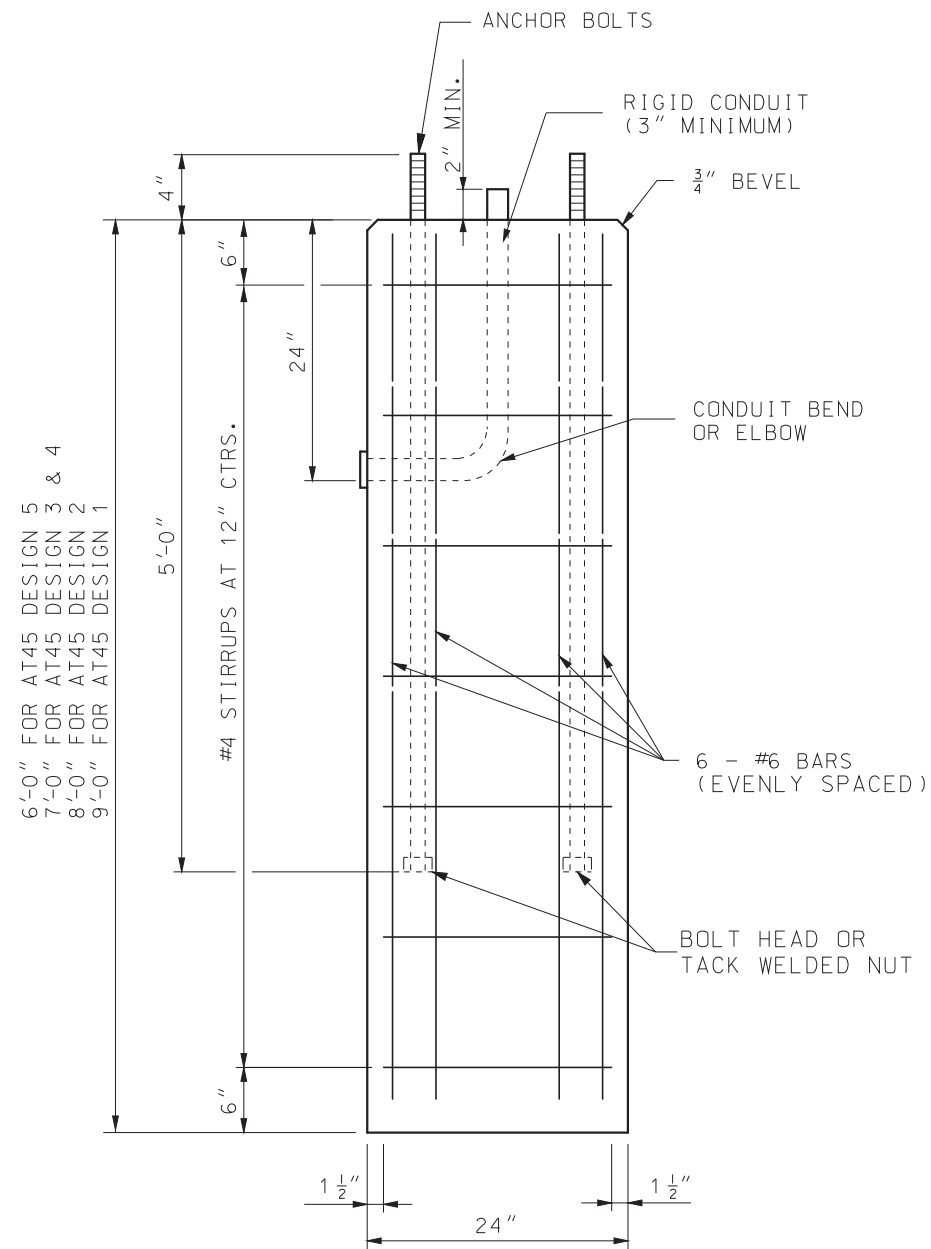
ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>HIGHWAY LIGHTING POLES, FOUNDATIONS AND APPURTENANCES FOR 45' MOUNTING HEIGHT</p> |
| DATE EFFECTIVE: 12/01/2013 DATE PREPARED: 2/9/2018 | 901.01AJ SHEET NO. 5 OF 6 |

NOTE:
ANCHOR BOLTS SHALL BE
PLACED ONLY FOR 17 1/4"
BOLT CIRCLE



PLAN

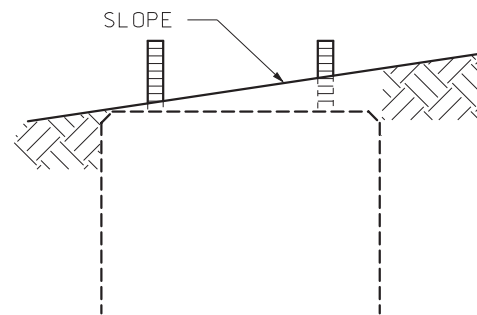


ELEVATION

DETAILS OF CONCRETE
FOUNDATION ④

- ④ AT THE OPTION OF THE CONTRACTOR THE CONCRETE FOUNDATIONS MAY BE PRECAST. IF PRECAST, THEY SHALL BE SET IN DRILLED HOLES 3 FEET IN DIAMETER AND 6 INCHES DEEPER THAN THE BOTTOM OF THE CONCRETE FOUNDATION. THE BOTTOM 6 INCHES OF THE HOLE AND THE REMAINING SPACE AROUND THE FOUNDATION SHALL BE BACKFILLED WITH WET TAMPED LIMESTONE SCREENINGS IN LAYERS NOT EXCEEDING 12 INCHES.

| QUANTITIES | | |
|------------|---------|--------|
| | CONC. | REINF. |
| HEIGHT | CU. YD. | LBS. |
| 6'-0" | .70 | 80 |
| 7'-0" | .81 | 90 |
| 8'-0" | .93 | 104 |
| 9'-0" | 1.05 | 120 |



CONCRETE FOUNDATION
EMBEDMENT

GENERAL NOTES:

ALL CLASSIFICATIONS ARE ASTM UNLESS OTHERWISE NOTED. SEE STANDARD SPECIFICATIONS FOR CLASSIFICATIONS NOT SHOWN.

ALL BOLT CIRCLES FOR 45' MOUNTING HEIGHT SHALL BE 17 1/4".

ALL CONECTOR PLATE AND CLOSURE PLATE THICKNESSES SHOWN ARE MINIMUM DIMENSIONS.

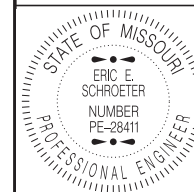
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED 1 1/4" DIAMETER HIGH STRENGTH ANCHOR BOLTS.

ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED.



MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



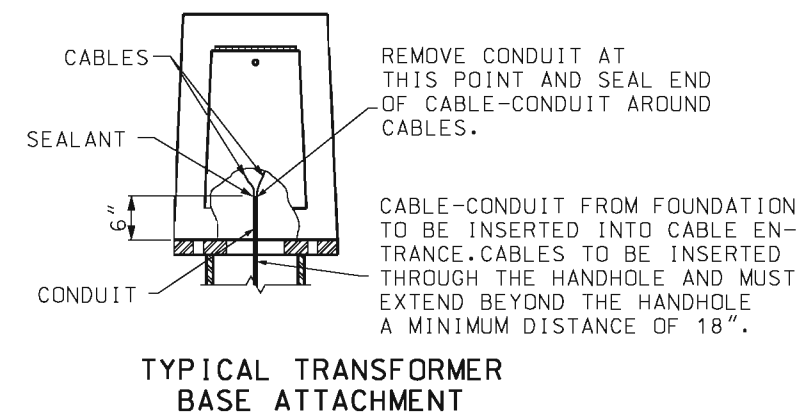
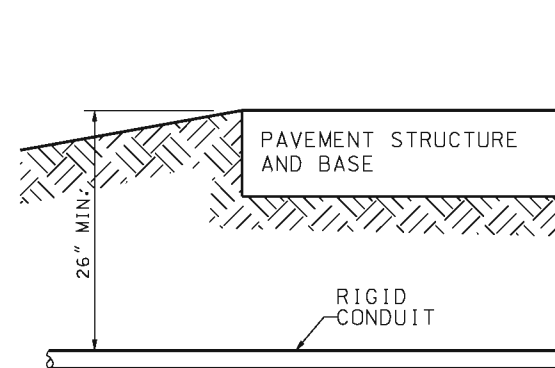
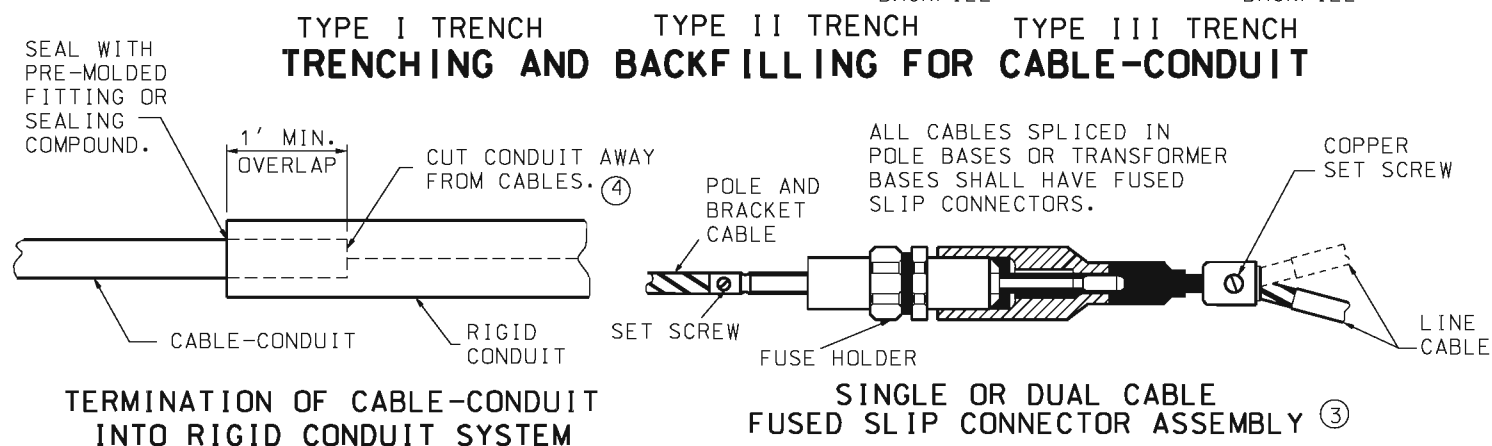
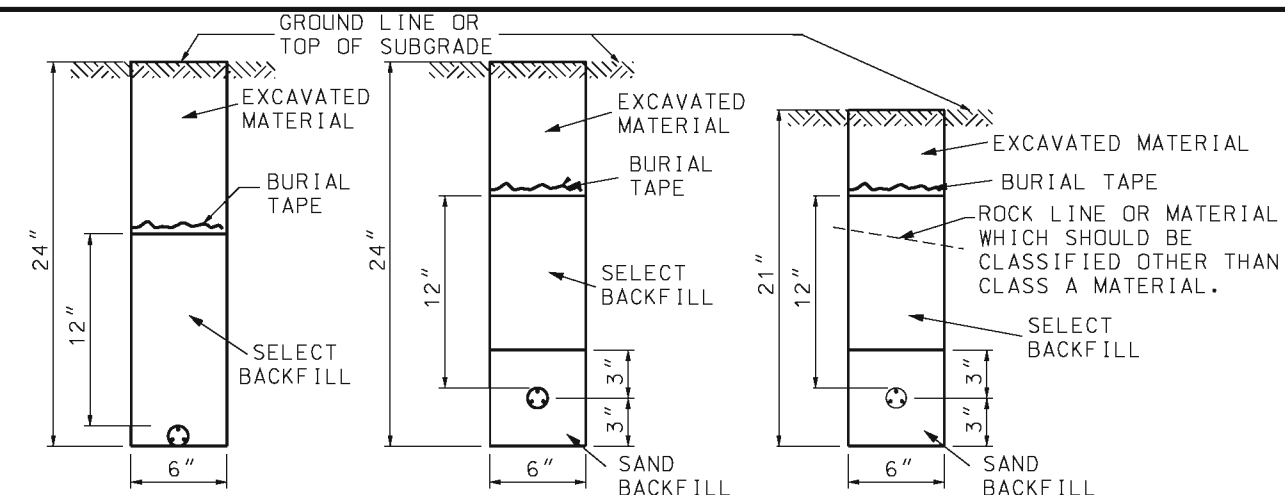
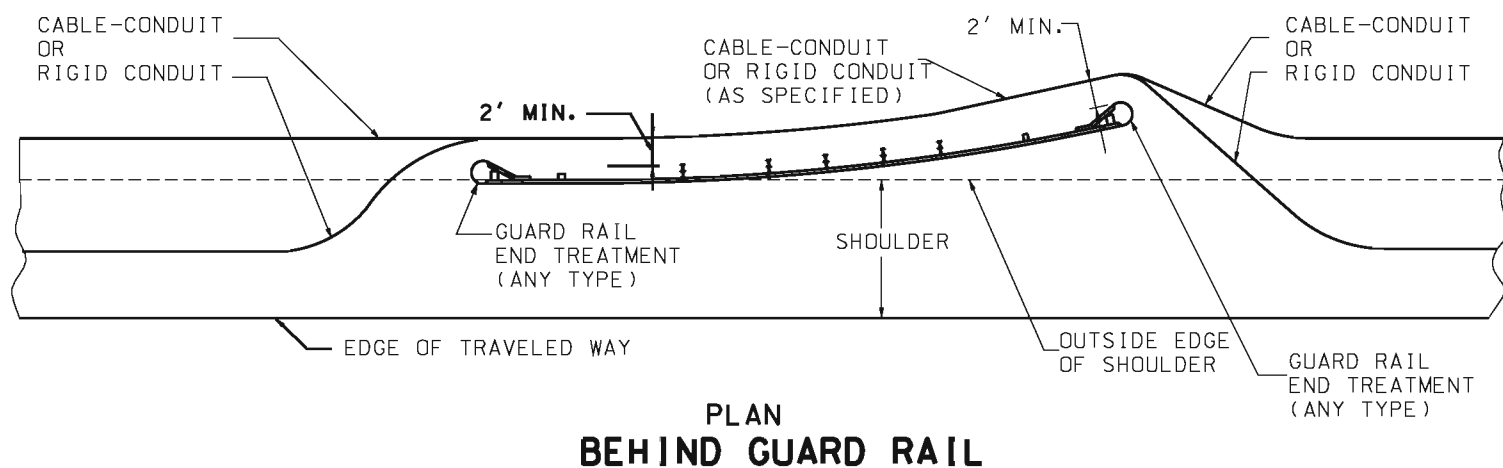
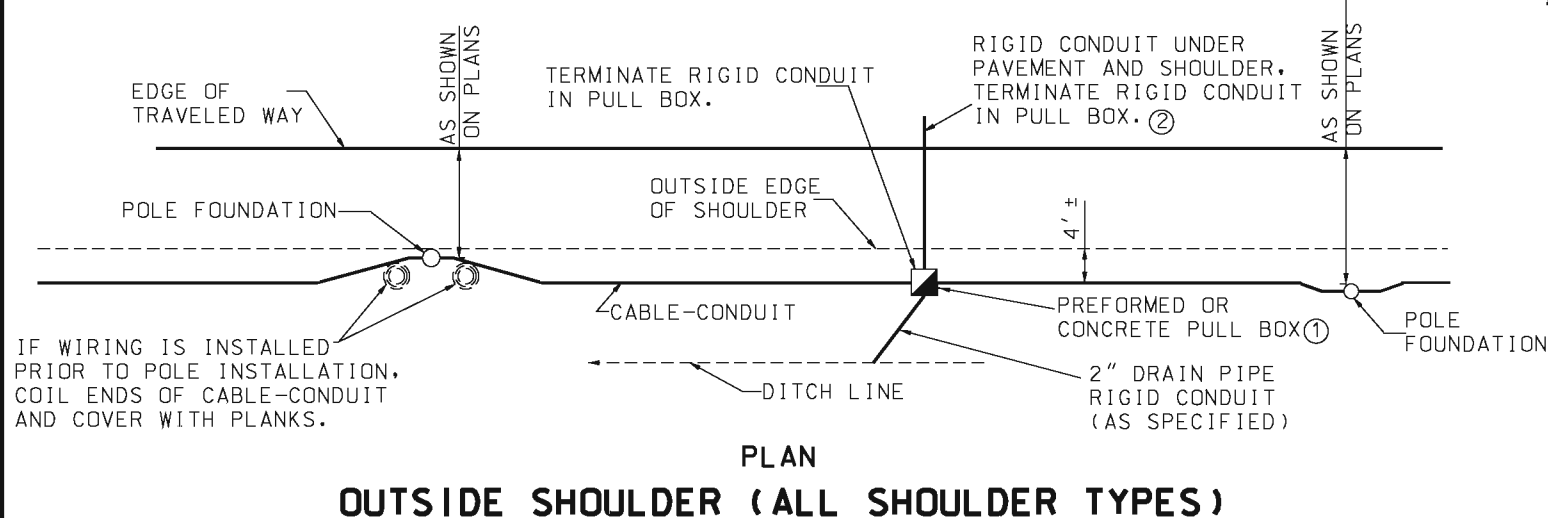
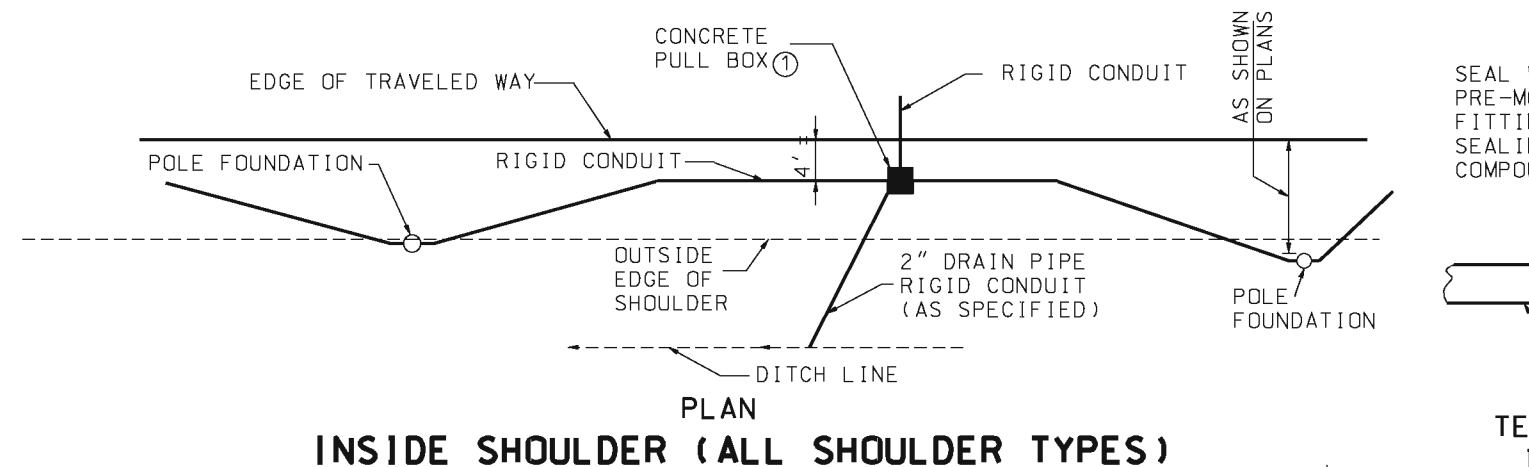
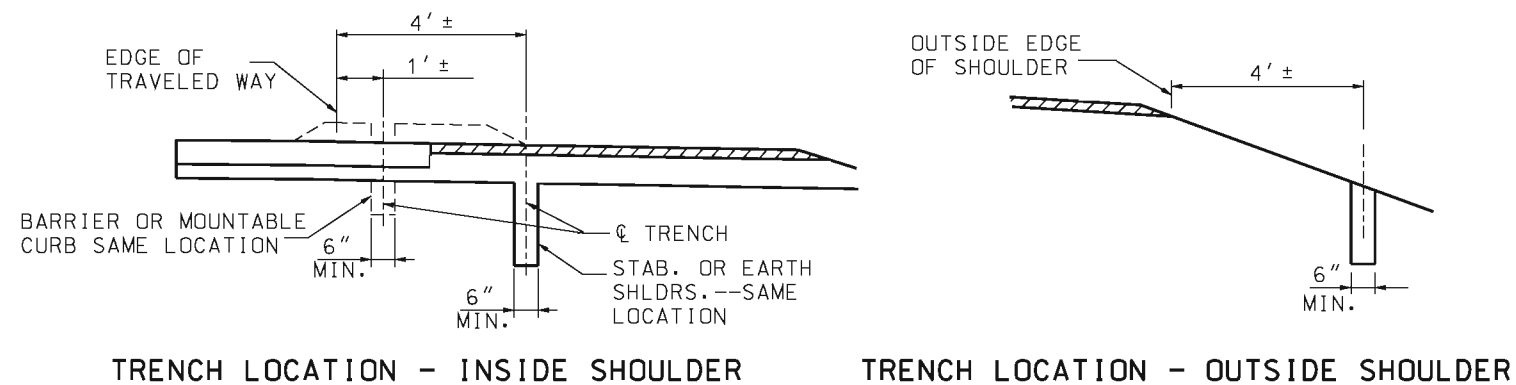
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

HIGHWAY LIGHTING
POLES, FOUNDATIONS
AND APPURTENANCES
FOR 45' MOUNTING HEIGHT

DATE EFFECTIVE: 12/01/2013
DATE PREPARED: 2/9/2018

901.01AJ

SHEET NO.
6 OF 6



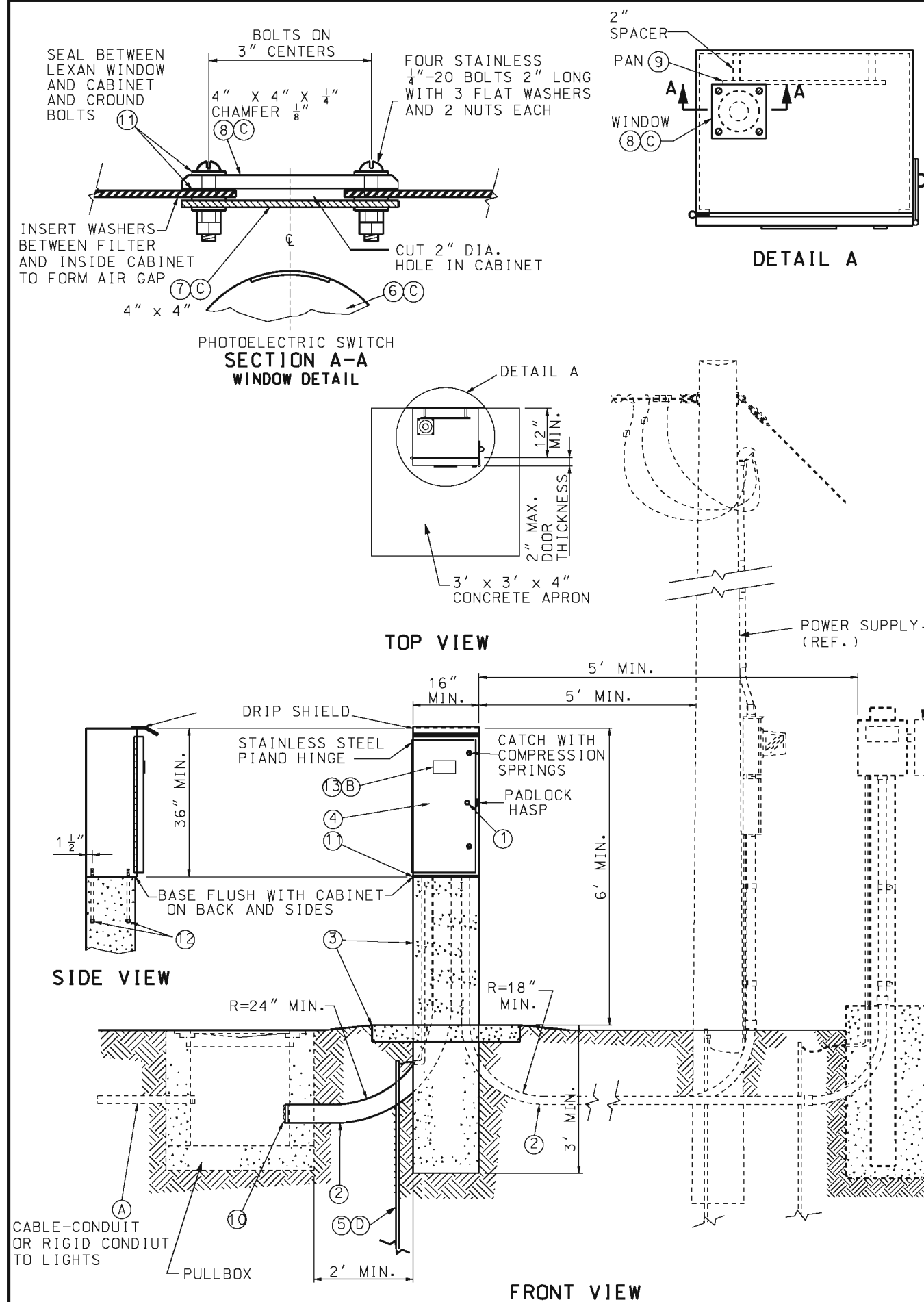
NOTES:

- ① SEE DRAWING 902.20 FOR PULL BOXES.
- ② CONDUIT MAY BE REMOVED FROM CABLES IN RIGID CONDUIT. SPLICES SHALL NOT BE MADE UNLESS SHOWN ON PLANS.
- ③ BRAND AND MODEL OF FUSE HOLDER SHALL BE APPROVED BY THE ENGINEER.
- ④ CABLES SHALL BE CONTINUOUS TO THE FIRST LIGHT POLE. SPLICES SHALL NOT BE MADE FOR THE PURPOSE OF TERMINATING CABLE-CONDUIT.

GENERAL NOTES:

THE CONDUIT OF THE CABLE-CONDUIT SHALL BE CUT AWAY FROM THE CABLES WHERE THEY ENTER THE RIGID CONDUIT INSIDE A CONCRETE BARRIER OR STRUCTURE.

| | |
|--|---|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>HIGHWAY LIGHTING CABLE, CONDUIT AND TRENCHING</p> |
| <p>DATE EFFECTIVE: 04/01/2002 DATE PREPARED: 3/10/2011</p> | <p>901.02B</p> |
| <p>SHEET NO. 1 OF 1</p> | |



| LIST OF MATERIALS | |
|-------------------|---|
| ITEM | DESCRIPTION |
| 1 | #2 CORBIN LOCK |
| 2 | RIGID CONDUIT * |
| 3 | CLASS B CONCRETE, 0.4 C.Y. ± |
| 4 | NEMA 4, DUST-TIGHT, WATERTIGHT, CABINET |
| 5 | GROUND ROD, $\frac{3}{4}$ " DIA. X 8' MIN. |
| 6 | PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000-WATT |
| 7 | TRANSLUCENT, PLEXIGLASS FILTER #W2067, $\frac{1}{8}$ " THICK |
| 8 | CLEAR, LEXAN #9034 WINDOW, $\frac{1}{4}$ " THICK MIN. |
| 9 | MOUNTING PAN, $31\frac{1}{2}$ " x 12" x $\frac{1}{4}$ " ALUMINUM OR STAINLESS STEEL |
| 10 | PLIABLE DUCT SEALANT |
| 11 | LIFETIME SILICONE CAULK |
| 12 | ANCHOR BOLTS, 5/8-11 x 14" LONG BOLTS, HOT DIP GALVANIZED, 4 REQUIRED, USE BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END |
| 13 | WEATHERPROOF ADHESIVE LABEL, VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL) |
| | * - SEE PLANS |

NOTES

- (A) IF CABLE-CONDUIT IS SPECIFIED, THE CONDUIT SHALL BE CUT AWAY FROM CABINET BETWEEN PULL BOX AND CONTROL STATION.
- (B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.
- (C) PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- (D) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADCWELDED.

GENERAL NOTES:

ALTERNATE CABINET DIMENSIONS WILL BE ALLOWED AS APPROVED BY THE ENGINEER. INTERIOR CABINET VOLUME SHALL BE EQUAL TO OR GREATER THAN THAT SHOWN ON PLANS AND PROPER CLEARANCES SHALL BE PROVIDED FOR ALL EQUIPMENT. CONCRETE BASE DIMENSIONS SHALL BE MODIFIED TO FIT THE CABINET SUPPLIER.

PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.

CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP
MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE
MOUNT PHOTO CONTROL SHALL FACE NORTH.



SEE PLANS FOR CIRCUIT WIRING; MAXIMUM LOADING PER CIRCUIT IS 7,400 WATTS FOR 240 VOLT AND 11,000 WATTS FOR 480 VOLT.

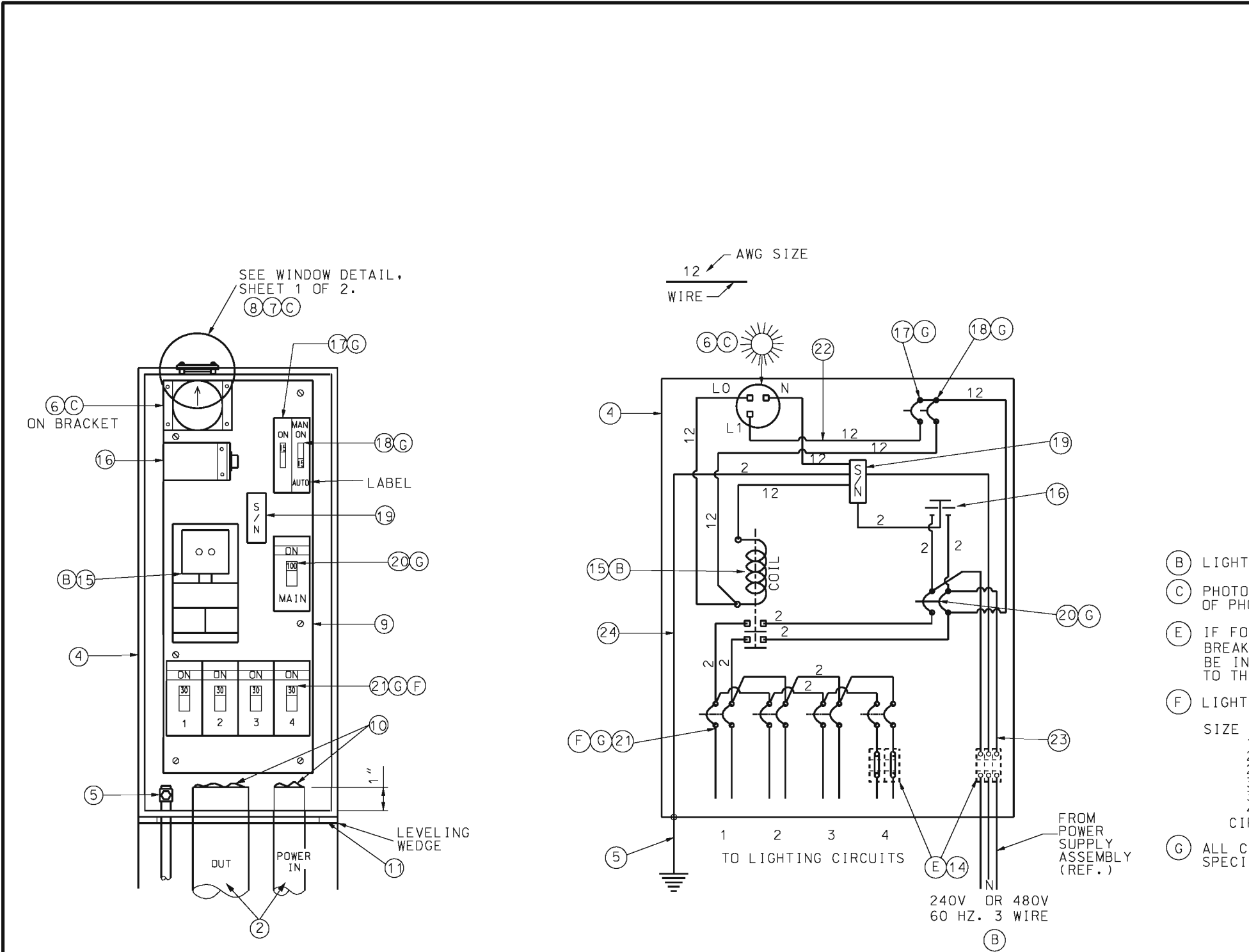
SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF
CABINET DOOR.

THE UTILITY SHALL BE NOTIFIED IN WRITING 30 DAYS
PRIOR TO DATE SERVICE WILL BE REQUIRED.

ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED
WITH LIFETIME SILICONE CAULK.

ALL MATERIALS REQUIRED EXCLUDING REFERENCE ITEMS AS SHOWN ON DRAWING SHALL BE INCLUDED IN PRICE BID FOR CONTROL STATION.

| | | | |
|---|---|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65107 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p align="center"> HIGHWAY LIGHTING BASE MOUNTED CONTROL STATION 240 V OR 480 V - 4 CIRCUIT </p> | | |
| DATE EFFECTIVE: <u>04/01/2005</u> DATE PREPARED: <u>9/14/2010</u> | 901.30F | | SHEET NO. 1 OF 2 |




EQUIPMENT LAYOUT

WIRING DIAGRAM

| LIST OF MATERIALS | |
|-------------------|--|
| ITEM | DESCRIPTION |
| 2 | RIGID CONDUIT * |
| 4 | NEMA 4, DUST-TIGHT, WATERTIGHT CABINET |
| 5 | GROUND ROD, 3/4" DIA. X 8' MIN. |
| 6 | PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT |
| 7 | TRANSLUCENT, PLEXIGLASS FILTER #W2067, 1/8" THICK |
| 8 | CLEAR, LEXAN #9034 WINDOW, 1/4" THICK MIN. |
| 9 | MOUNTING PAN, 31 1/2" X 12" X 1/4" ALUMINUM OR STAINLESS STEEL |
| 10 | PLIABLE SEALANT |
| 11 | LIFETIME SILICONE CAULK |
| 14 | INSULATED TERMINAL BLOCK, FOR GREATER THAN 4/0 CABLE |
| 15(240V) | 2-POLE, 100 AMP, 120V COIL LIGHTING CONTACTOR |
| 15(480V) | 2-POLE, 100 AMP, 240V COIL LIGHTING CONTACTOR |
| 16 | 2-POLE, 650 VOLT LIGHTING ARRESTER |
| 17 | 1-POLE, 15 AMP, TYPE B CONTROL BREAKER |
| 18 | 1-POLE, 15 AMP, TYPE B MANUAL-AUTO SWITCH |
| 19 | INSULATED GROUNDABLE NEUTRAL, 100 AMP |
| 20 | 2-POLE, 100 AMP, TYPE A MAIN BREAKER |
| 21 | 2-POLE, 15 AMP(MIN), TYPE A LIGHTING BREAKERS |
| 22 | #12 AWG MIN., 600 V. CONTROL CABLE |
| 23 | #2 AWG MIN., 600 V. * POWER CABLE |
| 24 | #2 AWG MIN., 600 V. GROUND CABLE |
| * | SEE PLANS |


NOTES

- (B) LIGHTING SYSTEM VOLTAGE AS SPECIFIED ON PLANS.
- (C) PHOTOELECTRIC SWITCH BRACKETS MAY VARY. LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- (E) IF FOR REASONS OF VOLTAGE DROP A WIRE SIZE IS SPECIFIED LARGER THAN THE BREAKER LUGS CAN ACCOMMODATE, AN INSULATED HEAVY DUTY TERMINAL BLOCK SHALL BE INSTALLED TO TERMINATE THE LARGER WIRES AND A SMALLER JUMPER CONNECTED TO THE BREAKER ITSELF.
- (F) LIGHTING BREAKER SIZING:
- | SIZE (AMPS) | 240V TOTAL
CIRCUIT LOAD (WATTS) | 480V TOTAL
CIRCUIT LOAD (WATTS) |
|-------------|------------------------------------|------------------------------------|
| 15 | 0-2800 | 0 - 5500 |
| 20 | 2850-3700 | 5550 - 7400 |
| 25 | 3750-4600 | 7450 - 9200 |
| 30 | 4650-5500 | 9250 - 11,000 |
| 35 | 5550-6500 | -- |
| 40 | 6550-7400 | -- |
- CIRCUIT LOAD INCLUDES LOAD DUE TO LINE LOSS, LAMP, AND BALLAST LOAD.
- (G) ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.



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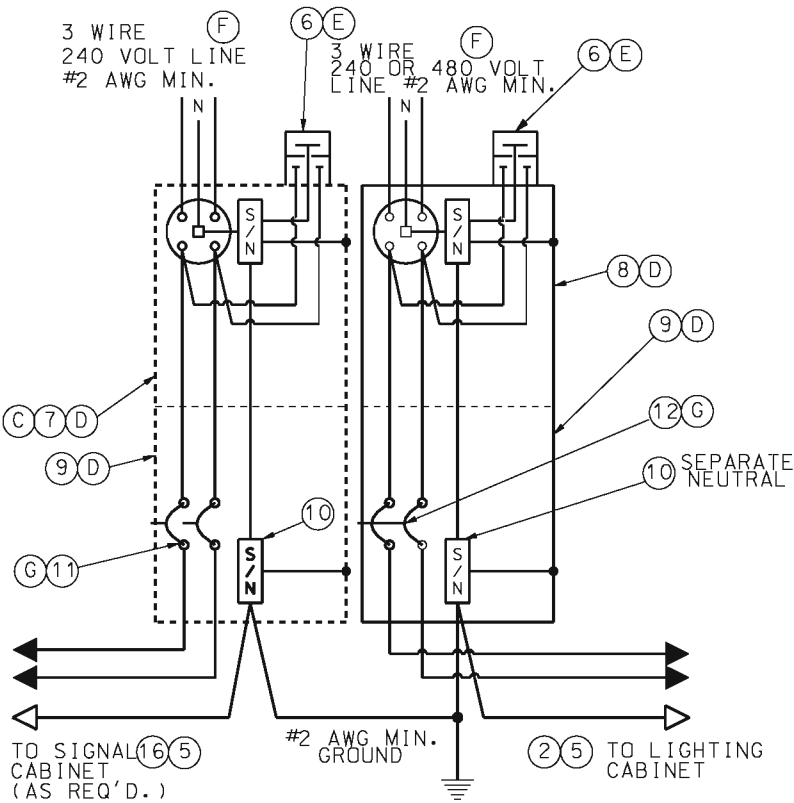
HIGHWAY LIGHTING
BASE MOUNTED
CONTROL STATION
240 V OR 480 V - 4 CIRCUIT

DATE EFFECTIVE: 04/01/2005
DATE PREPARED: 8/26/2009

901.30F

SHEET NO.
2 OF 2

| LIST OF MATERIALS | |
|-------------------|--|
| ITEM | DESCRIPTION |
| 1 | SERVICE POLE 30' MIN., CLASS 4 WOOD, CONTRACTOR PROVIDED, MoDOT OWNED* |
| 2 | #2 AWG MIN. CABLE, 600 VOLT * |
| 3 | SERVICE ENTRANCE HEAD |
| 4 | GUY CABLE, AS REQUIRED |
| 5 | RIGID CONDUIT, 2" MIN., WITH PREFORMED ELBOWS |
| 6 | LIGHTNING ARRESTER, VALVE TYPE, 2 POLE, 650 VOLT |
| 7 | METER SOCKET, 200 AMP, FOR SIGNALS |
| 8 | METER SOCKET, 200 AMP, FOR LIGHTING |
| 9 | LOCKING, RAIN TIGHT, NEMA 4 SERVICE DISCONNECT BOX |
| 10 | INSULATED, GROUNDABLE NEUTRAL WIRE, 200 AMP MINIMUM |
| 11 | SIGNAL BREAKERS, SINGLE POLE, 40A MIN, TYPE A OR B * |
| 12 | LIGHTING BREAKER, 2 POLE, 240 VOLT, 100A, TYPE A OR B |
| 13 | 1/2" METAL CONDUIT |
| 14 | #2 AWG MIN. GROUND WIRE |
| 15 | GROUND ROD, 3/4" x 8' MIN. |
| 16 | #8 AWG MIN. CABLE, 600 VOLT * |
| 17 | CLASS B CONCRETE, 0.92 C.Y. ± |
| 18 | THREADED CONDUIT HUB WITH SEALING WASHERS |
| 19 | WEATHERPROOF ADHESIVE LABEL (LIGHTING), VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL) |
| 20 | WEATHERPROOF ADHESIVE LABEL (SIGNALS), VINYL RAISED LETTERING (OR EQUIVALENT, SEE DETAIL) |
| 21 | W6 x 9 OR W6 x 15 GALVANIZED POST |
| 22 | #2 AWG MIN. CABLE, 600 VOLT |
| 23 | RIGID CONDUIT, 2" MINIMUM |
| * | SEE PLANS |



WIRING DIAGRAM
LIGHTING AND/OR SIGNALS

NOTES:

- (A) SERVICE POLE SHALL BE GUYED WHEN SPAN OF OVERHEAD SERVICE WIRE EXCEEDS 50 FEET.
- (B) INCREASE 1 FOOT FOR EACH 5 FEET ABOVE 30 FEET.
- (C) SERVICE DISCONNECT BOXES AND METER BOXES SHALL BE ALUMINUM OR STAINLESS STEEL. ALL HARDWARE, HINGES, CATCHES, ETC. SHALL BE STAINLESS STEEL. METER SOCKET FOR SIGNALS OR LIGHTING AND OTHER EQUIPMENT AND MATERIALS SHALL BE U.L. APPROVED, AND CONFORM TO THE REQUIREMENTS OF THE UTILITY COMPANY OR MUNICIPALITY PROVIDING POWER.
- (D) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.
- (E) UTILITY COMPANY SHALL DECIDE IF LIGHTNING ARRESTERS ARE TO BE CONNECTED ON THE LOAD OR LINE SIDE OF THE METER. THE UTILITY COMPANY SHALL ALSO DECIDE IF THE LIGHTNING ARRESTER IS TERMINATED IN THE METER OR DISCONNECT CABINET. IF TERMINATED IN THE DISCONNECT CABINET, IT SHALL BE INSTALLED ON THE DISCONNECT CABINET.
- (F) LIGHTING SYSTEM VOLTAGE OF 240 VOLTS OR 480 VOLTS AS SHOWN ON THE PLANS.
- (G) BREAKERS SHALL CONFORM TO SEC. 901.4 OF THE STANDARD SPECIFICATIONS.
- (H) IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

GENERAL NOTES:

FOR CABLE TYPES AND INSTALLATION, SEE STANDARD SPECIFICATIONS.

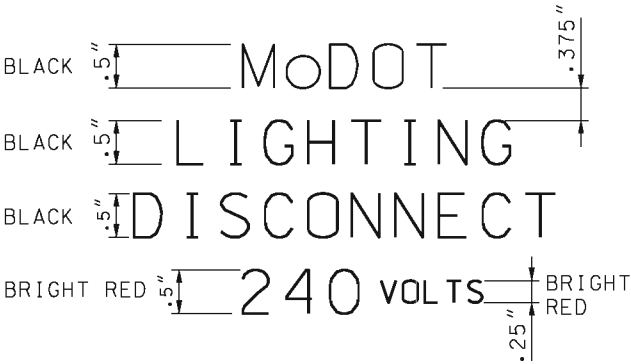
THE POWER SUPPLY ASSEMBLY TYPE IS SHOWN ON THE PLANS OR IS DESIGNATED IN THE CONTRACT.

THE UTILITY COMPANY SHALL BE NOTIFIED IN WRITING 30 DAYS PRIOR TO DATE SERVICE WILL BE REQUIRED.

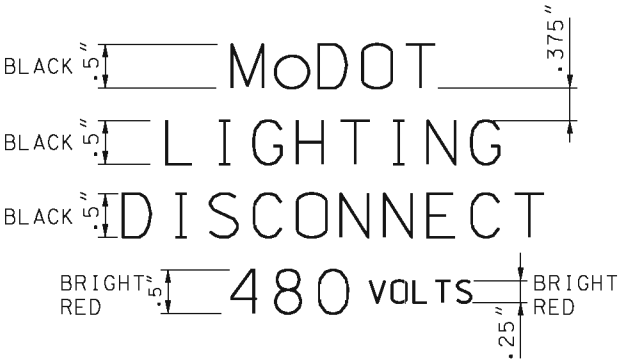
WHERE SIGNAL OR LIGHTING POWER ONLY IS DESIGNATED, OMIT ITEMS NOT REQUIRED.

ALL OPENINGS IN ANY SERVICE BOX OR METER BOX SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

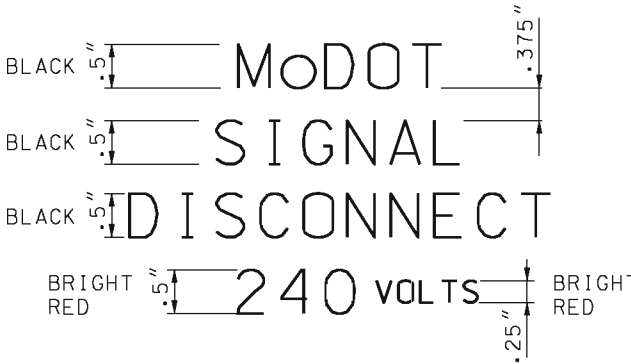
ALL MATERIALS REQUIRED AS SHOWN ON DRAWING, INCLUDING CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES, SHALL BE INCLUDED IN UNIT BID PRICE FOR POWER SUPPLY ASSEMBLY.




LABEL DETAIL (19) (240 VOLT) (F)



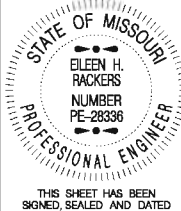
LABEL DETAIL (19) (480 VOLT) (F)



LABEL DETAIL (20)



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

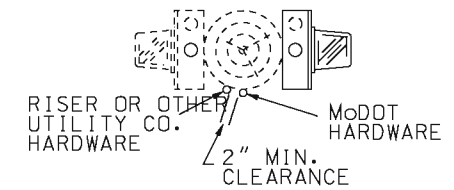
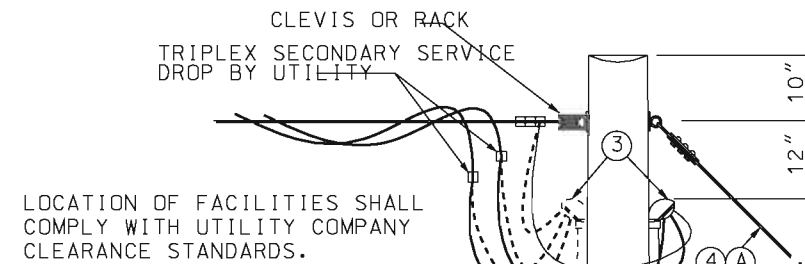
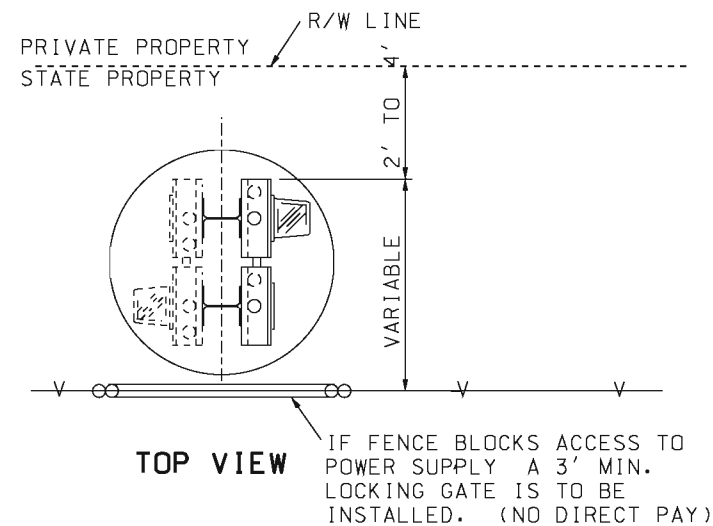


**HIGHWAY LIGHTING
POWER SUPPLY ASSEMBLY
SECONDARY SERVICE**

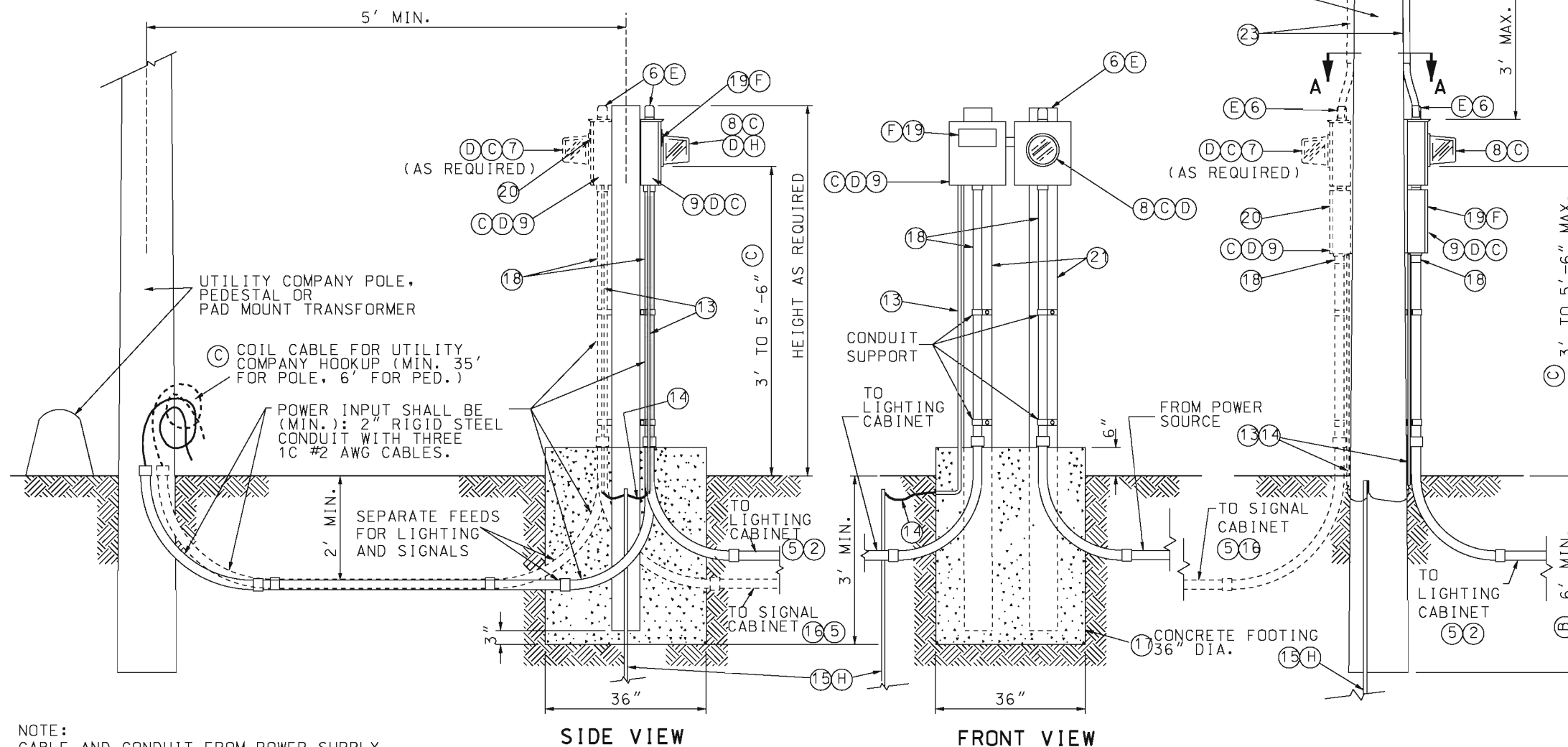
| | | |
|----------------------------|---------|---------------------|
| DATE EFFECTIVE: 04/01/2002 | 901.80D | SHEET NO. 1 OF 2 |
| DATE PREPARED: 4/1/2010 | | |

PEDESTAL OR NEW STATE-OWNED POLE TO BE SET WITHIN 2' TO 4' OF RIGHT-OF-WAY LINE.

ALL SERVICE POWER SUPPLY ASSEMBLIES ARE TO BE LOCATED ON STATE PROPERTY.



SECTION A-A



TYPE 2 (PEDESTAL)
UNDERGROUND SERVICE

TYPE 1 (POLE)
OVERHEAD SERVICE



NOTE:
CABLE AND CONDUIT FROM POWER SUPPLY ASSEMBLY TO UTILITY COMPANY FACILITIES SHALL BE INCLUDED IN PRICE BID FOR POWER SUPPLY ASSEMBLY.

| | | |
|--|--|-----------------------------|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | | |
| <p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>HIGHWAY LIGHTING POWER SUPPLY ASSEMBLY SECONDARY SERVICE</p> | |
| <p>DATE EFFECTIVE: 04/01/2002</p> <p>DATE PREPARED: 5/19/2010</p> | <p>901.80D</p> | <p>SHEET NO. 2 OF 2</p> |

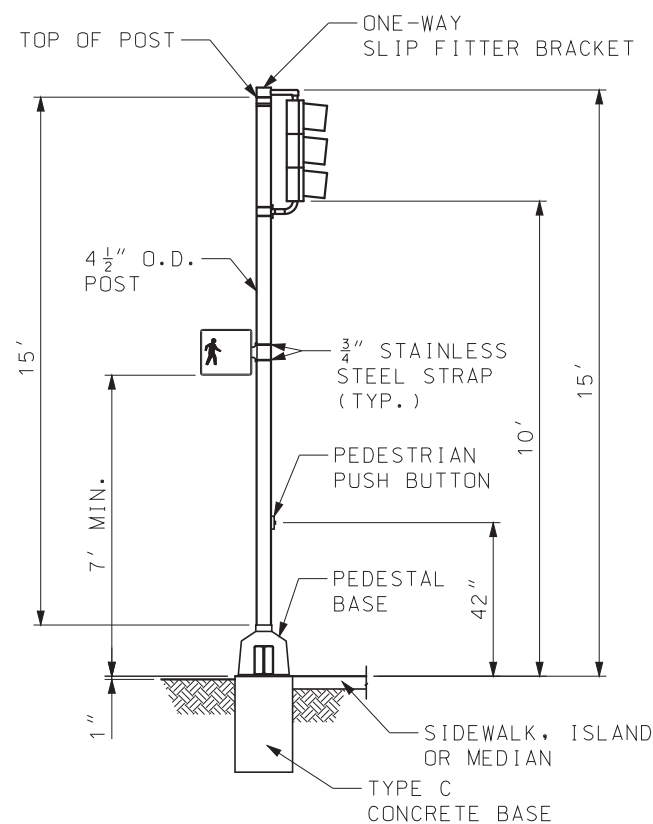
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| | |
|--|---|
| | LED-C LUMINAIRE |
| | BRACKET ARM |
| | BOLT DOWN LIGHT STANDARD |
| | EXISTING LIGHT STANDARD AND LUMINAIRE |
| | LED-A LUMINAIRE |
| | LED-B LUMINAIRE |
| | 150 WATT UNDERPASS LUMINAIRE |
| | HIGH MAST TOWER WITH LUMINAIRE ARM |
| | PULL BOX, TYPE I DRAIN, CONCRETE |
| | PULL BOX, TYPE II DRAIN, CONCRETE |
| | PULL BOX, TYPE I DRAIN, PREFORMED |
| | PULL BOX, TYPE II DRAIN, PREFORMED |
| | EXISTING PULL BOX, TYPE I DRAIN, CONCRETE |
| | EXISTING PULL BOX, TYPE II DRAIN, CONCRETE |
| | EXISTING PULL BOX, TYPE I DRAIN, PREFORMED |
| | EXISTING PULL BOX, TYPE II DRAIN, PREFORMED |

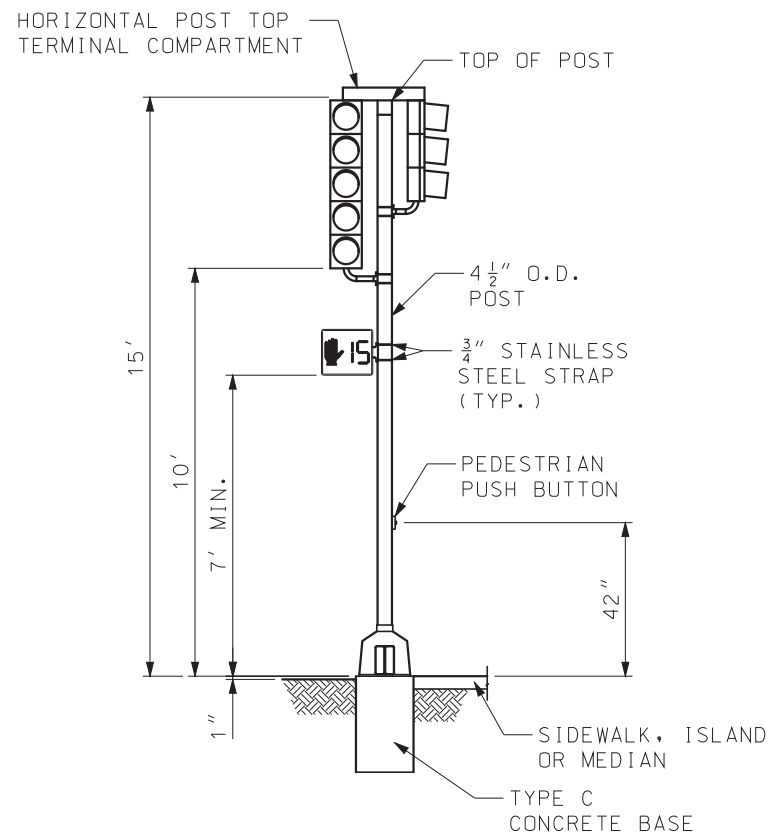
| | |
|--|--|
| | SERVICE POLE OR PEDESTAL AND POWER SUPPLY |
| | TRANSFORMER OR SUBSTATION POLE |
| | BASE MOUNTED LIGHTING CONTROL STATION WITH PAD |
| | EXISTING BASE MOUNTED CONTROL STATION |
| | GROUND CONNECTION |
| | RIGID CONDUIT IN TRENCH |
| | CAPPED RIGID CONDUIT |
| | RIGID CONDUIT PUSHED |
| | EXISTING RIGID CONDUIT |
| | RIGID CONDUIT ON BRIDGE |
| | RIGID CONDUIT IN MEDIAN |
| | CABLE CONDUIT WITH CIRCUIT NUMBER |
| | EXISTING CABLE CONDUIT |
| | EXPOSED CONDUIT ON UNDER SIDE OF BRIDGES. NUMBER OF HATCHES DENOTES NUMBER OF WIRES IN CONDUIT |

| | |
|--|-----------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small> | <h2>HIGHWAY LIGHTING SYMBOLS</h2> |
| DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | 901.85B |
| SHEET NO. 1 OF 1 | |

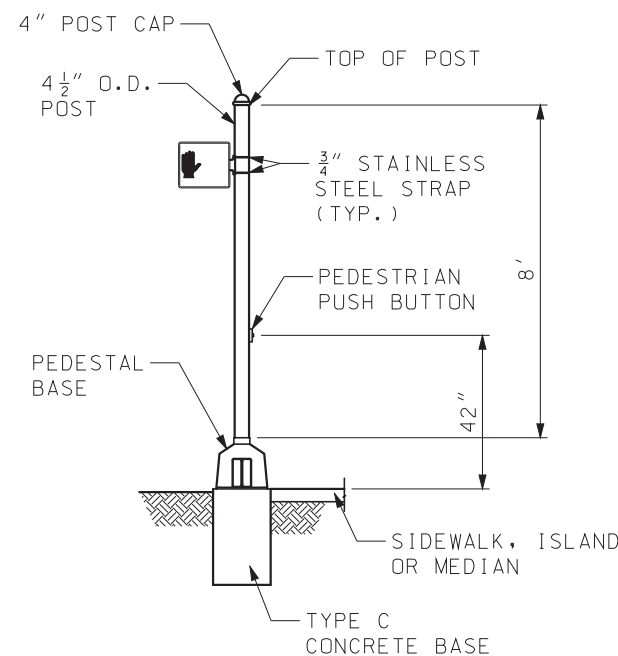
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



ONE FACE



TWO FACE
PEDESTAL POST MOUNTINGS



GENERAL NOTES:

ALL POST WIRE OUTLETS SHALL BE DEBURRED AND EQUIPPED WITH BUSHINGS.

BACKPLATES NOT SHOWN IN MOUNTING DIAGRAMS FOR CLARITY.

POSTS SHALL BE GROUNDED WITH #6 AWG BARE COPPER WIRE FROM GROUNDING BUSHING ON CONDUIT TO GROUNDING LUG IN POST BASE IF STEEL CONDUIT IS USED. IF PVC CONDUIT IS USED, PROVIDE #6 AWG BARE COPPER WIRE FROM GROUNDING LUG IN POST TO POWER SUPPLY GROUND BUSS IN CONTROLLER CABINET.

LEADS FROM PEDESTRIAN SIGNAL LAMPS ARE CONNECTED TO THE SIGNAL HEAD TERMINAL COMPARTMENT.

TYPE C MOUNTED SIGNALS SHALL HAVE A DISCONNECT HANGER.

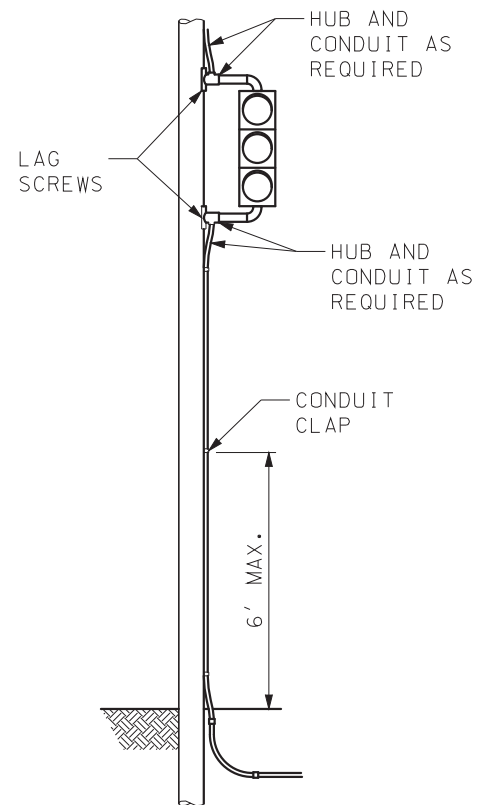
TYPE B MOUNTED SIGNALS SHALL HAVE A TERMINAL COMPARTMENT.

ONE FACE, TOP-MOUNTED (TYPE T) OR SIDE-MOUNTED (TYPE S) SIGNALS HAVE NO TERMINAL COMPARTMENT. TWO FACE, TOP-MOUNTED (TYPE T) OR SIDE-MOUNTED (TYPE S) SIGNALS SHALL HAVE A HORIZONTAL TERMINAL COMPARTMENT.

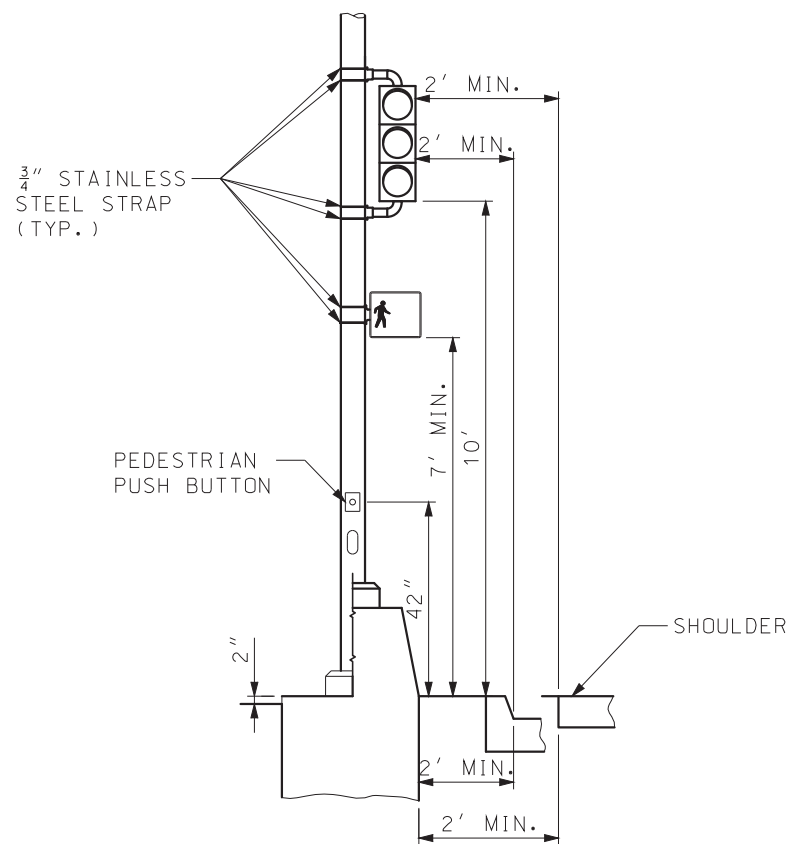
SIDE-MOUNTED OPTICALLY LIMITING HEADS SHALL HAVE A MINIMUM POST CLEARANCE OF 5 1/2 inches.

SIGNAL APPURTENANCES SHALL HAVE A HORIZONTAL CLEARANCE NO LESS THAN 2 feet FROM THE FACE OF A VERTICAL CURB OR FROM THE OUTSIDE EDGE OF A SHOULDER, EXCEPT SIGNALS LOCATED IN A MEDIAN ISLAND.


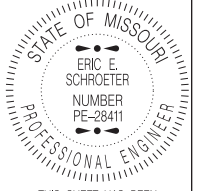
SEE STANDARD PLAN 902.30 FOR BASE DETAILS AND CONDUIT LOCATIONS.



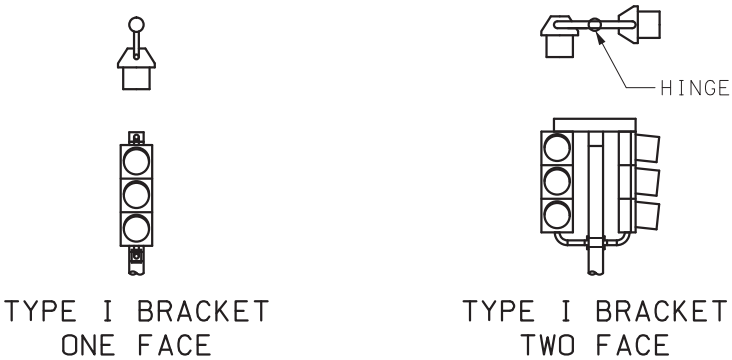
WOOD POLE
MOUNTING



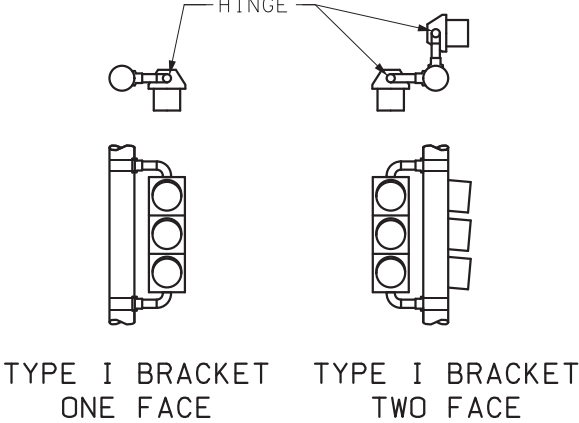
METAL POST
MOUNTING

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TRAFFIC SIGNALS SIGNAL HEAD MOUNTING |
| DATE EFFECTIVE: 07/01/2017 DATE PREPARED: 5/1/2017 | SHEET NO. 902.00P 1 OF 2 |

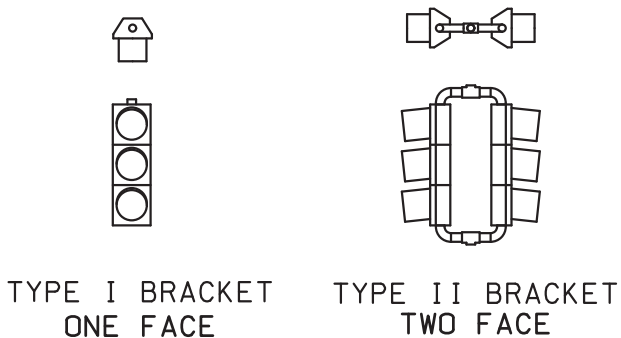
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



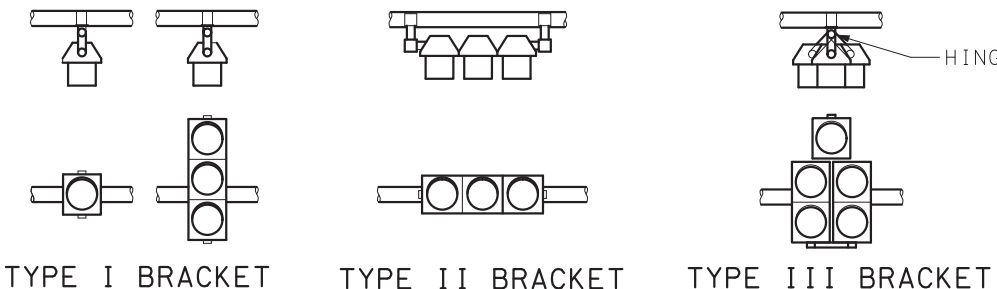
TOP-MOUNT (TYPE T)



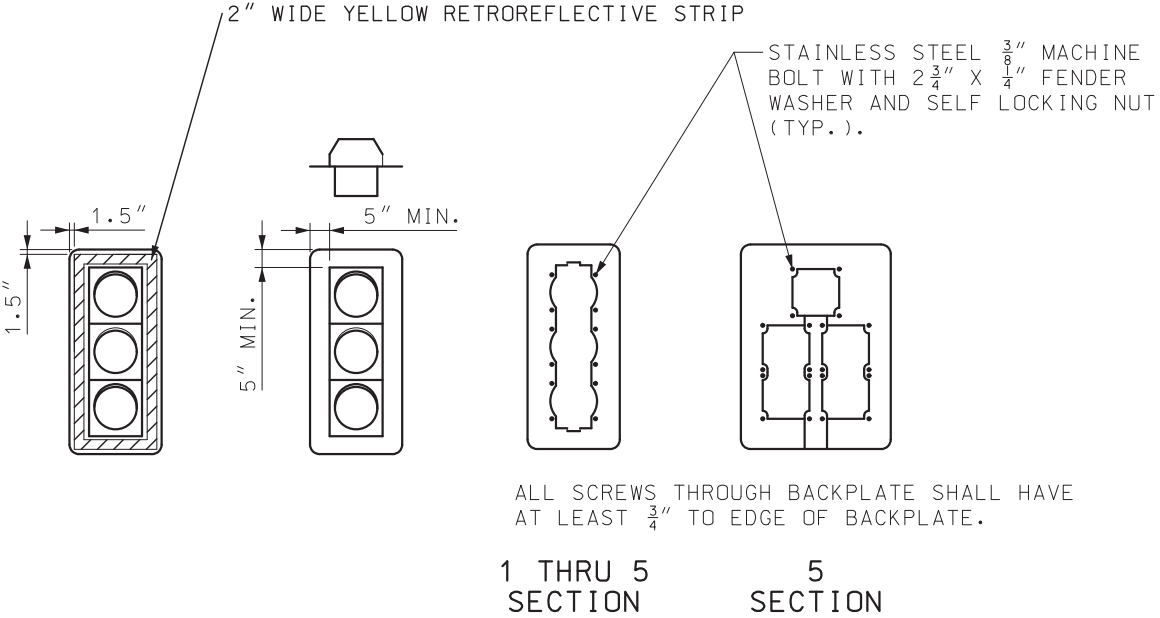
SIDE-MOUNT (TYPE S)



OVERHEAD SPANWIRE (TYPE C)



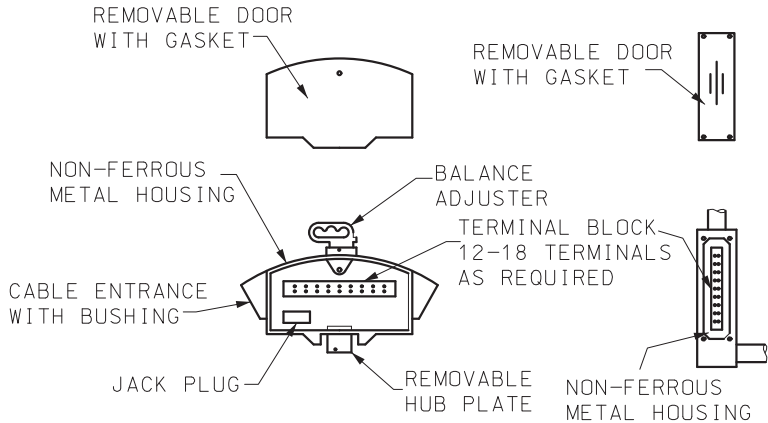
MAST ARM (TYPE B)
(SEE DRAWING 902.40)



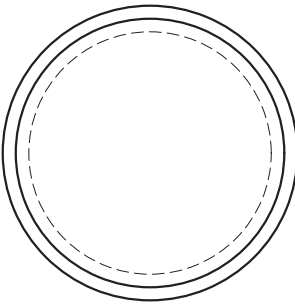
BACKPLATES

TUNNEL

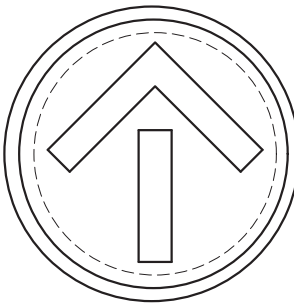
VISORS



TERMINAL COMPARTMENT



CIRCULAR




ARROW



PEDESTRIAN

INDICATIONS



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER
PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

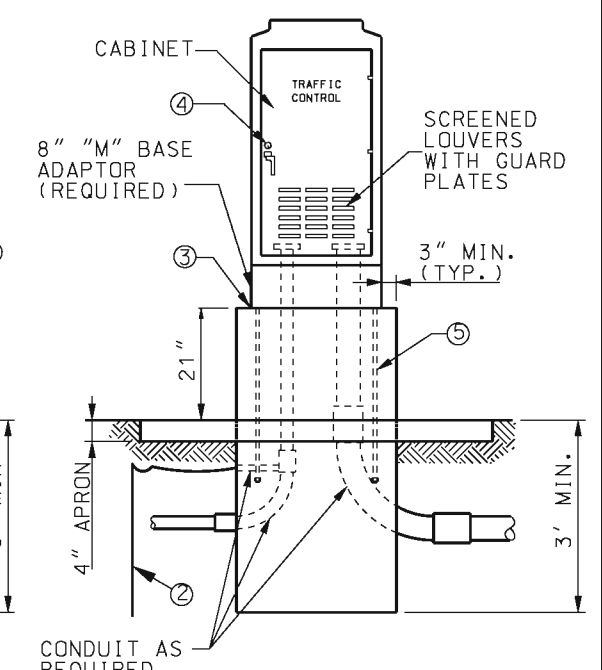
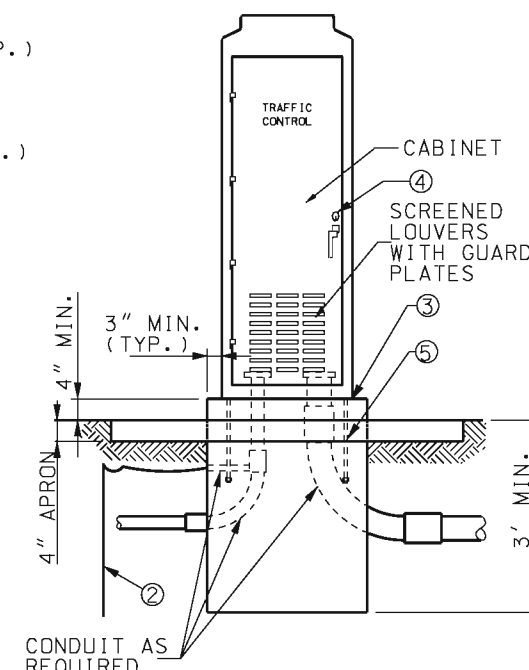
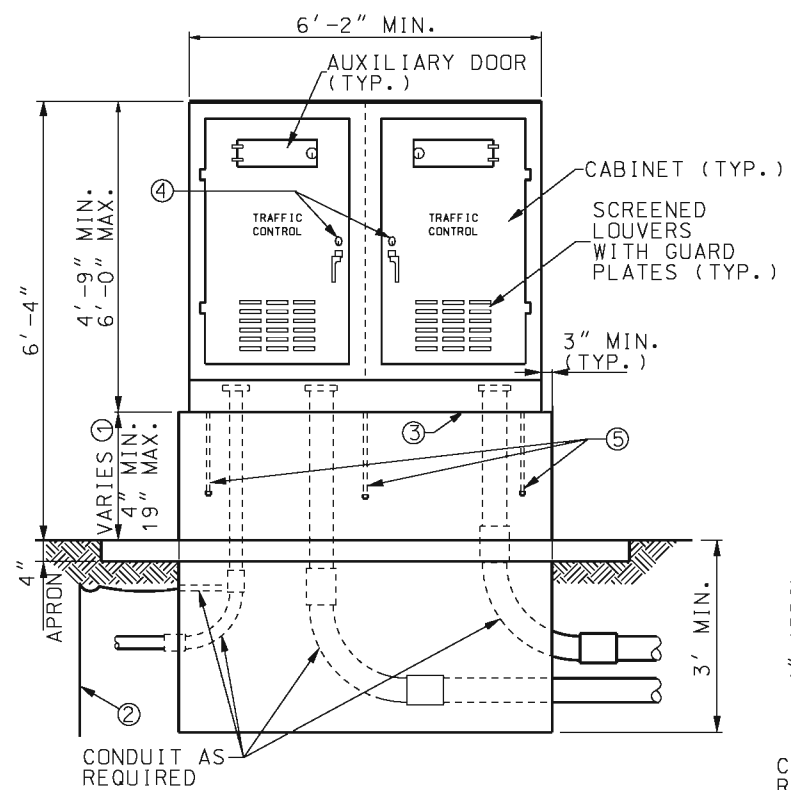
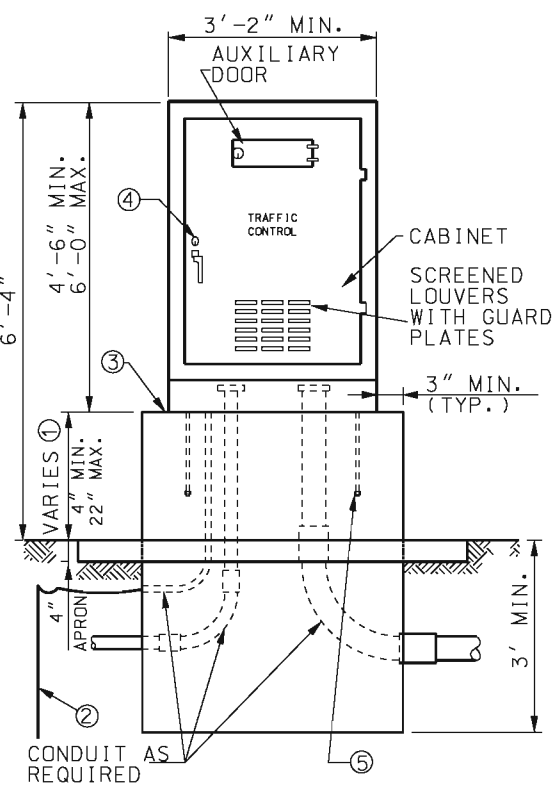
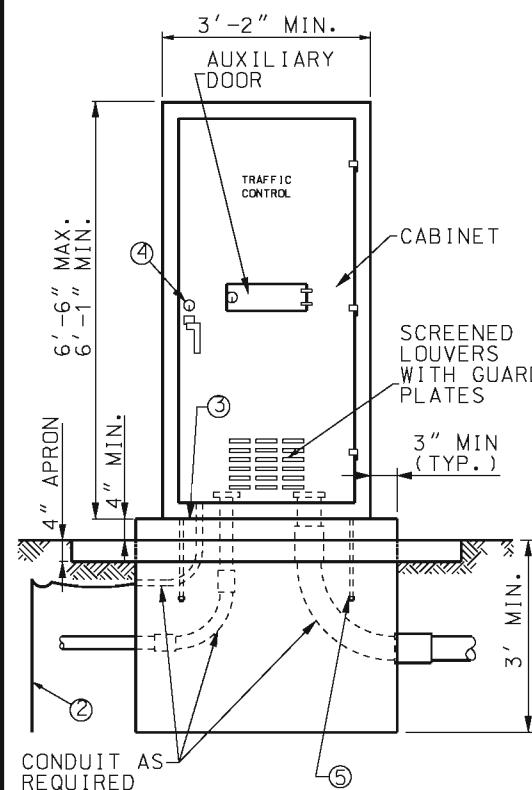
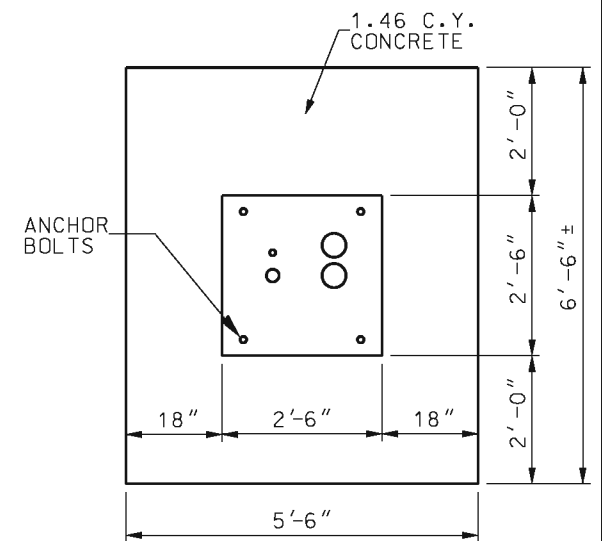
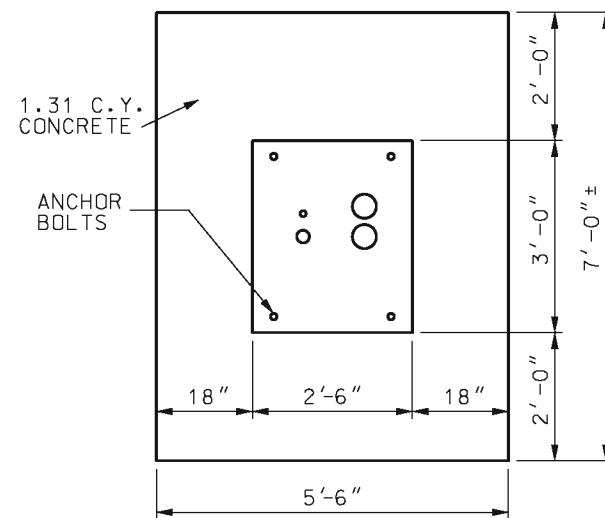
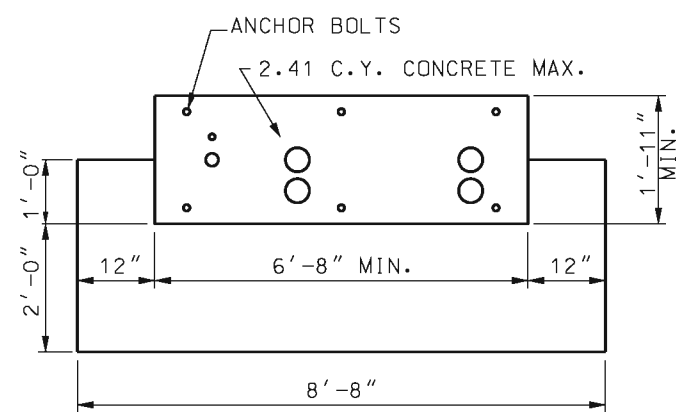
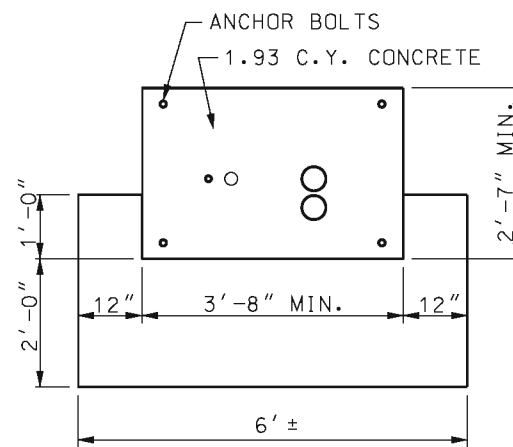
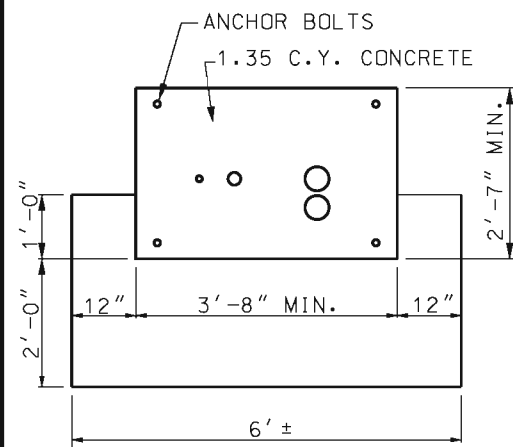
TRAFFIC SIGNALS
SIGNAL HEAD LOUVERS,
VISORS, BACKPLATES AND
TERMINAL COMPARTMENT

DATE EFFECTIVE: 07/01/2018
DATE PREPARED: 5/3/2018

902.00P

SHEET NO.
2 OF 2

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



FOR CONTROLLER CABINETS, WITH
HEIGHTS FROM 6'-1" TO 6'-6"

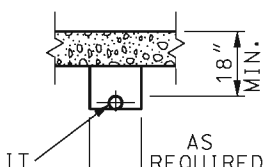
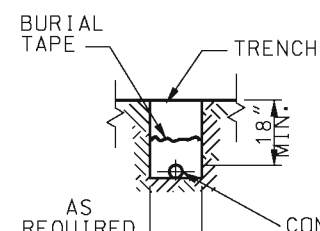
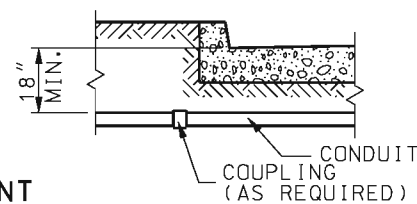
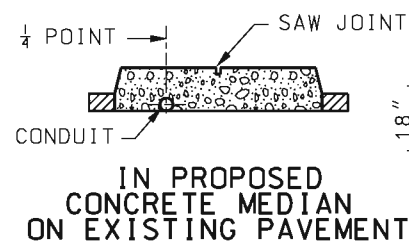
FOR CONTROLLER CABINETS, WITH
HEIGHTS FROM 4'-4" TO 6'-0"

CONTROLLER CABINETS AND BASE TYPES

DOUBLE

FOR TYPE 170
CONTROLLER CABINETS
TYPE 332

FOR TYPE 170
CONTROLLER CABINETS
TYPE 336S



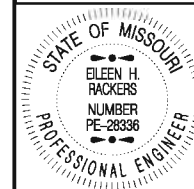
CONDUIT LOCATIONS

NOTES:

- ① DIMENSION VARIES ACCORDING TO CABINET HEIGHT.
- ② GROUND ROD, 3/4" DIA. x 8' MIN. IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.
- ③ LIFETIME SILICONE CAULK BETWEEN CABINET AND BASE.
- ④ #2 CORBIN LOCK
- ⑤ ANCHOR BOLTS (USE BOLT HEAD OR TACK WELDED NUT ON EMBEDDED END AND SIZE AS SPECIFIED BY CABINET MANUFACTURER).

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



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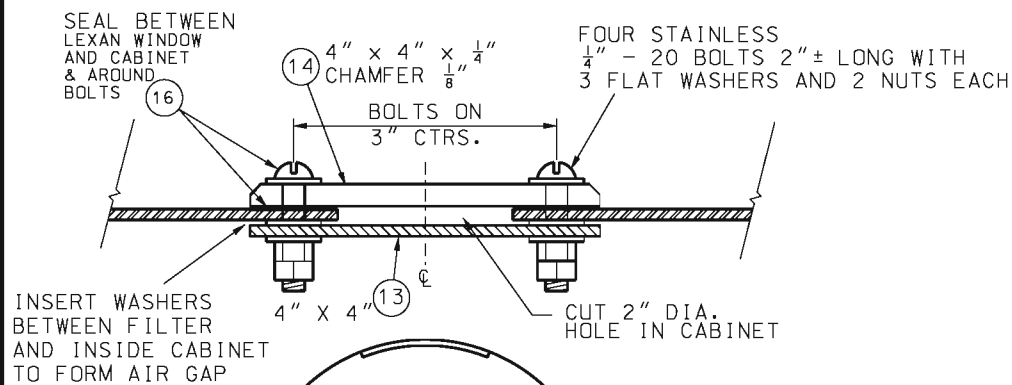
TRAFFIC SIGNALS
CONTROLLERS
CONDUIT LOCATION

DATE EFFECTIVE: 04/01/2005
DATE PREPARED: 8/26/2009

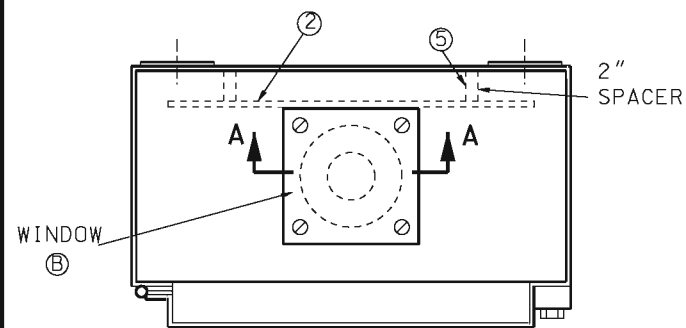
902.100

SHEET NO.
1 OF 1

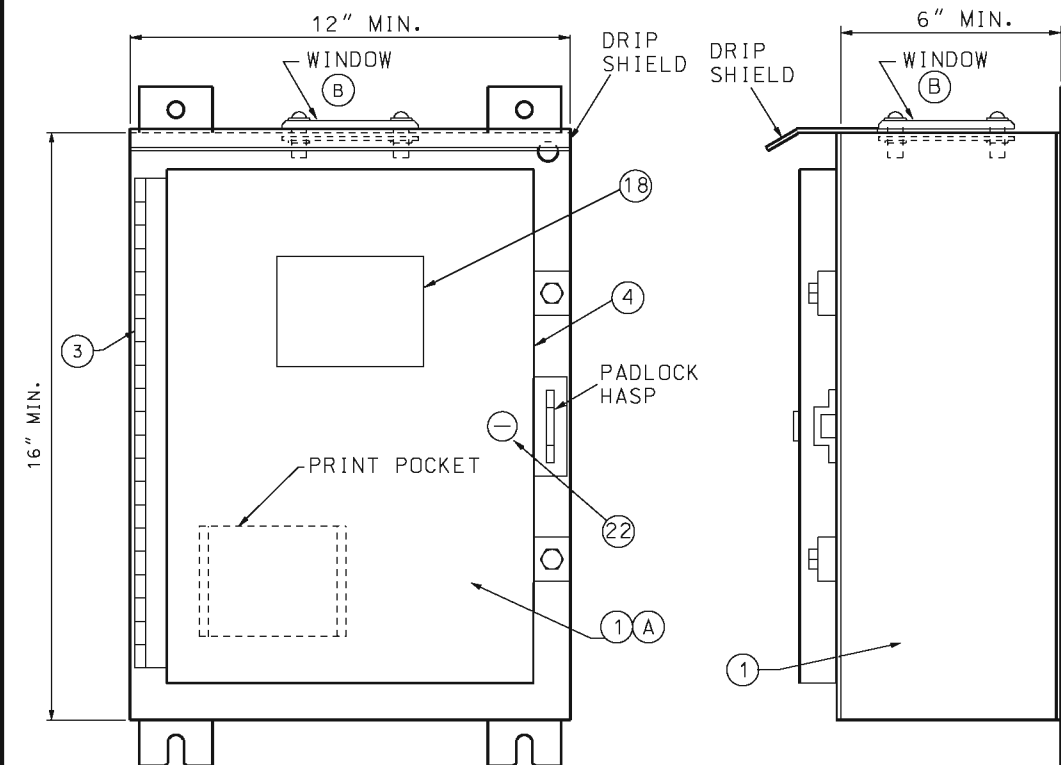
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PHOTOELECTRIC SWITCH
SECTION A-A
WINDOW DETAIL



TOP VIEW



FRONT VIEW

SIDE VIEW

BLACK 5" MODOT

BLACK 5" LIGHTING

BLACK 5" CONTROL

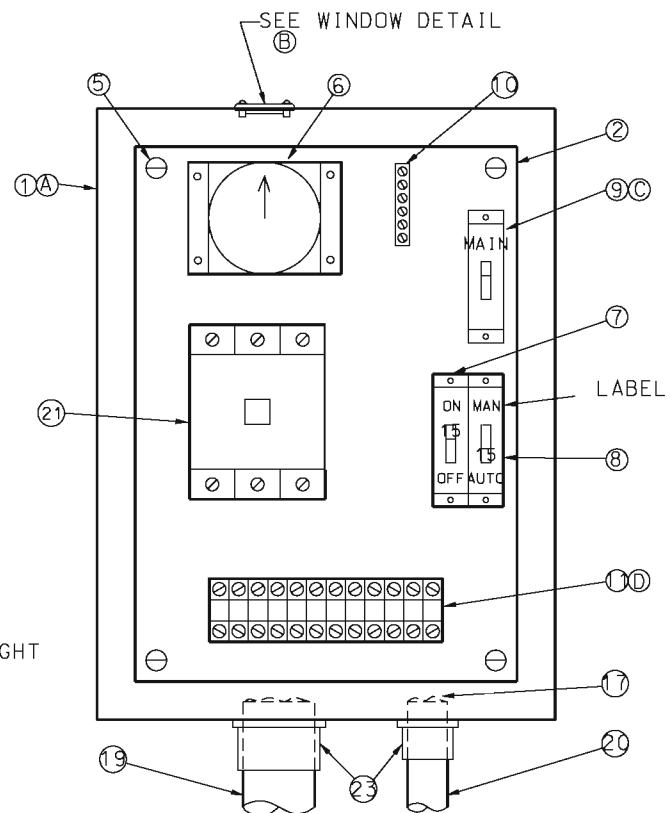
BRIGHT RED 5" 120 VOLTS

BRIGHT RED 5"

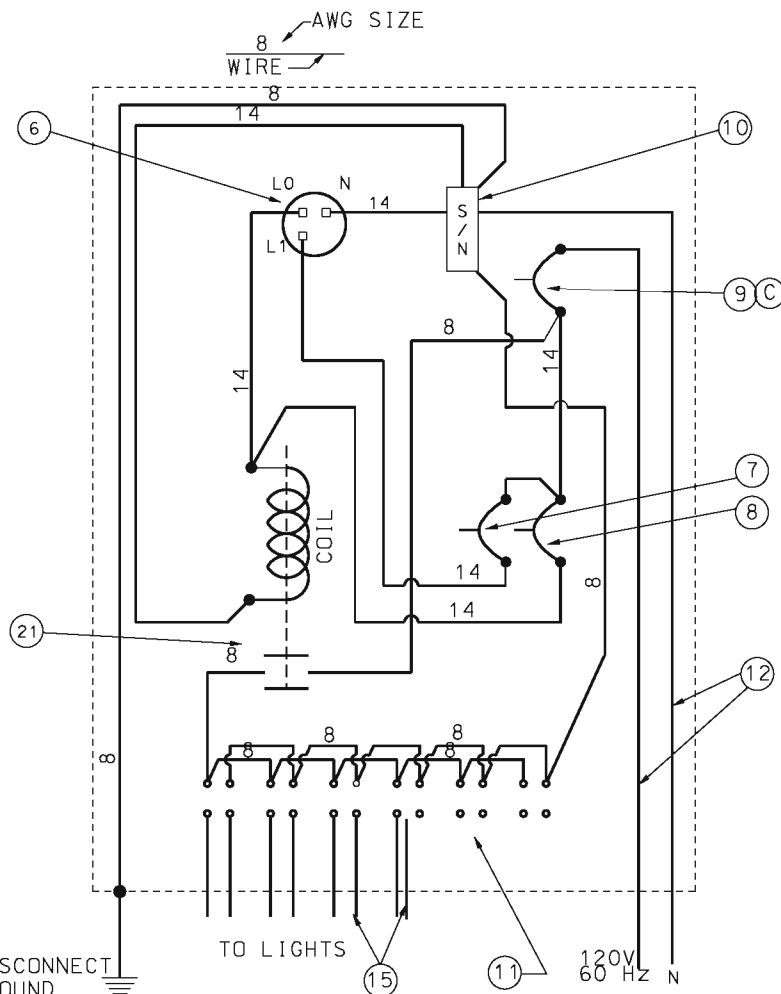
375"

25"

LABEL DETAIL (18)



EQUIPMENT LAYOUT



WIRING DIAGRAM

| ITEM | DESCRIPTION |
|------|---|
| 1 | CABINET, WATERTIGHT, NEMA 4, 14 GA MINIMUM THICKNESS |
| 2 | PANEL, 12 GA MINIMUM THICKNESS, ALUMINUM OR STAINLESS STEEL |
| 3 | CONTINUOUS STAINLESS STEEL HINGE |
| 4 | NEOPRENE GASKET DOOR |
| 5 | 3/8" - 16 COLLAR STUD |
| 6 | PHOTOELECTRIC SWITCH AND SOCKET, 105/285 V., 1000 WATT |
| 7 | 15 AMP CONTROL BREAKER, SINGLE POLE, TYPE B |
| 8 | 15 AMP AUTO-MANUAL SWITCH, SINGLE POLE BREAKER, TYPE B, WITH LABEL |
| 9 | MAIN BREAKER, SINGLE POLE, TYPE B * |
| 10 | NEUTRAL TERMINAL STRIP |
| 11 | LIGHTING TERMINAL BLOCK, INSULATED FROM BACK PANEL, 12 POSITION (E) |
| 12 | POWER, CABLE, #8 AWG MIN., 600 V. |
| 13 | FILTER, TRANSLUCENT, PLEXIGLASS #W2067, 1 8" THICK |
| 14 | CLEAR, LEXAN #9034 WINDOW, 1/4" THICK MIN. EXCEPT FOR 15A BREAKER; MIN. WIRE SIZE 10 AWG. |
| 15 | CABLE, LIGHTING * |
| 16 | LIFETIME SILICONE CAULK |
| 17 | PLIABLE DUCT SEALANT |
| 18 | LABEL-WEATHERPROOF ADHESIVE-VINYL RAISED LETTERING (OR EQUIV.) (SEE DETAIL) |
| 19 | CONDUIT, RIGID, 2" MIN. * |
| 20 | CONDUIT, RIGID, 1" MIN. |
| 21 | LIGHTING CONTACTOR, 2 POLE, 30 AMP, 600 VOLT, 120 VOLT COIL |
| 22 | #2 CORBIN LOCK |
| 23 | THREADED CONDUIT HUB WITH SEALING WASHERS |
| * | SEE PLANS |

NOTES:

- (A) SCHEMATIC DIAGRAM SHALL BE MOUNTED ON INSIDE OF CABINET DOOR.
- (B) PHOTOELECTRIC SWITCH BRACKETS MAY VARY, LOCATE CENTER OF WINDOW OVER CENTER OF PHOTOELECTRIC SWITCH.
- (C) MAIN BREAKER SIZE:
- | TOTAL LUMINAIRE** | BREAKER SIZE (AMPS) | MIN. AWG |
|-------------------|---------------------|----------|
| 0-920 | 15 | 10 |
| 930-1260 | 20 | 8 |
| 1270-1600 | 25 | 8 |
| 1610-1930 | 30 | 8 |
- ** EXCLUDING BALLAST LOAD
- (D) TERMINAL BLOCK SHALL BE RATED AT 600V, SHALL ACCEPT WIRES UP TO 8 AWG AND SHALL HAVE A BARRIER BETWEEN EACH TERMINAL AND ON EACH END.


GENERAL NOTES:

ALL OPENINGS IN CABINET SHALL BE COVERED AND SEALED WITH LIFETIME SILICONE CAULK.

ALL CIRCUIT BREAKERS SHALL CONFORM TO SECTION 901.4 OF THE STANDARD SPECIFICATIONS.

PLACEMENT OF ALL ITEMS SHALL BE APPROVED BY THE ENGINEER.

CABINET SHALL BE LOCATED AWAY FROM TRAFFIC. TOP MOUNT PHOTO CONTROL SHALL FACE AN OPEN SKY. SIDE MOUNT PHOTO CONTROL SHALL FACE NORTH.




MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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TRAFFIC SIGNALS

POWER SUPPLY ASSEMBLY

240/120 VOLT SERVICE



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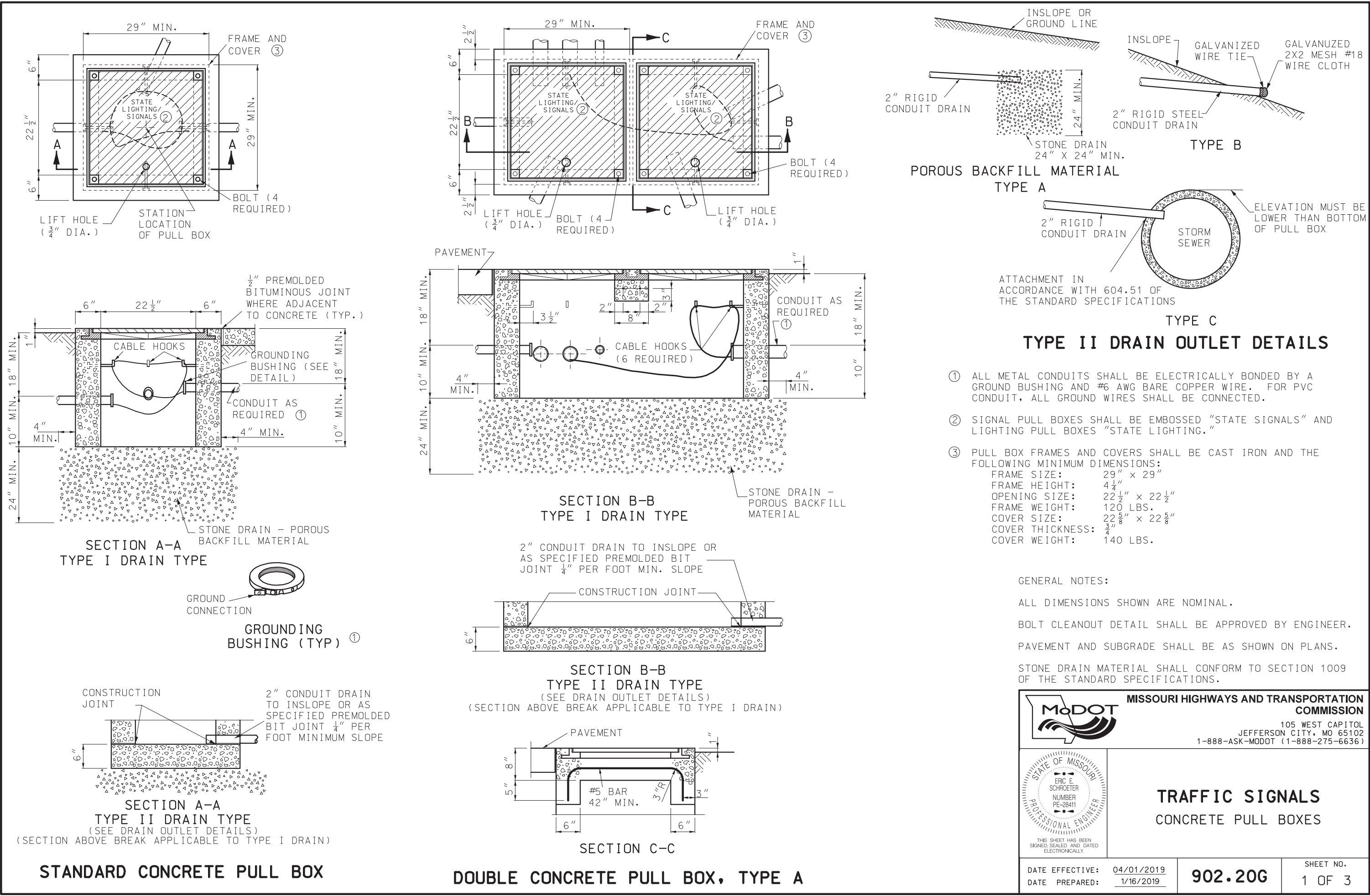
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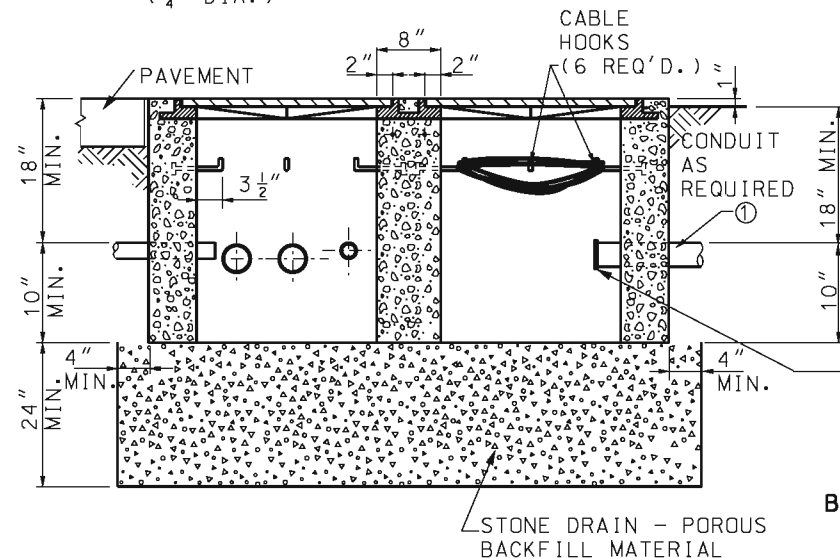
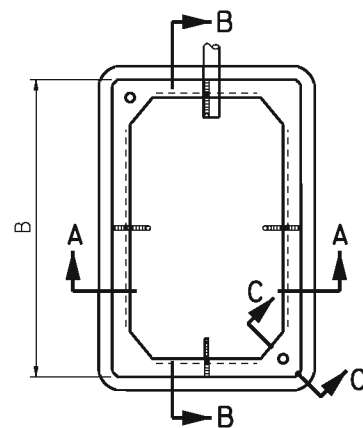
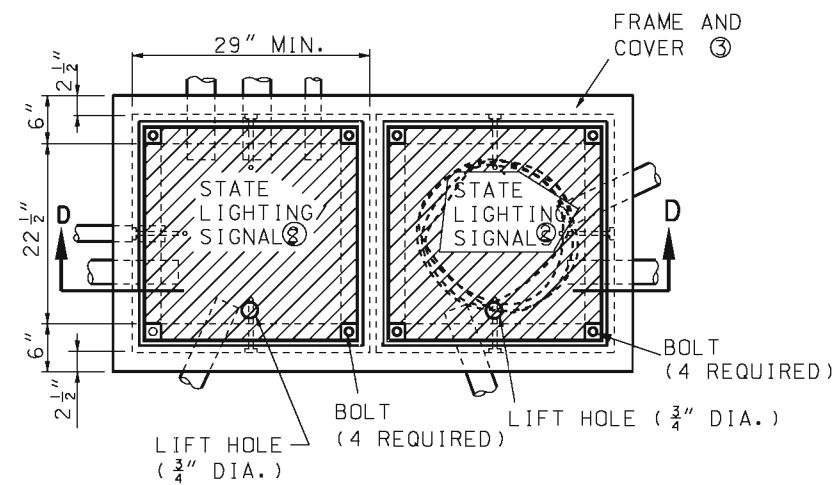
DATE PREPARED: 8/26/2009

902.15K

SHEET NO.
3 OF 3

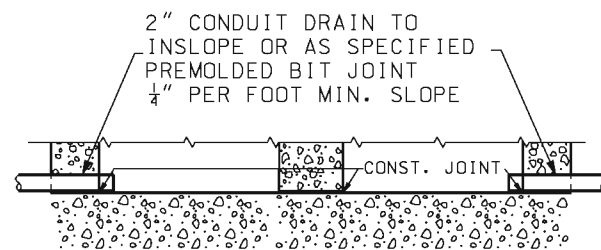
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SECTION D-D
TYPE I DRAIN TYPE

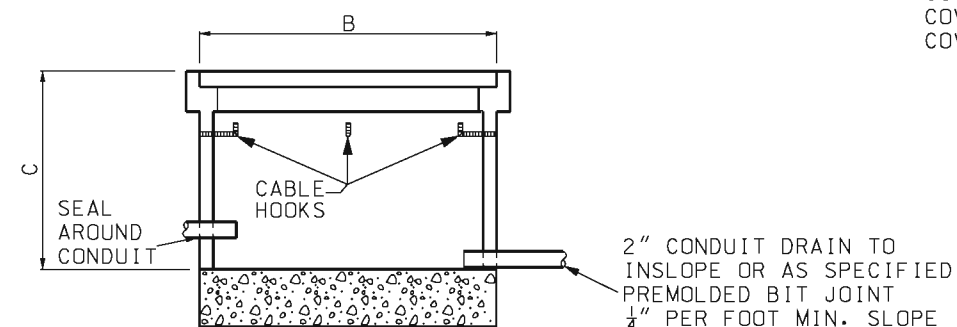
SECTION A-A
TYPE I DRAIN TYPE



TYPE II DRAIN TYPE
(SEE DRAIN OUTLET DETAILS)

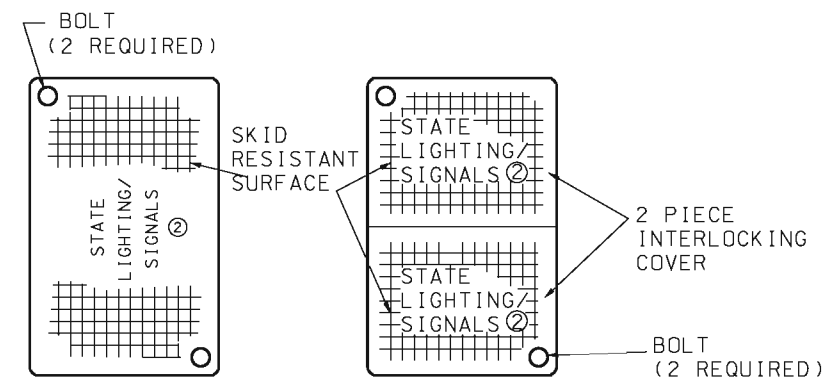
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN.)

DOUBLE CONCRETE PULL BOX, TYPE B



SECTION B-B
TYPE II DRAIN TYPE

PREFORMED PULL BOX



CLASS 1 OR 2
CLASS 3
PREFORMED PULL BOX COVER

| NUMBER OF ENTERING CONDUCTORS | CLASS | PREFORMED PULL BOX MINIMUM DIMENSIONS | | |
|-------------------------------|-------|---------------------------------------|-----|-----|
| | | A | B | C |
| < 23 | 1 | 17" | 30" | 22" |
| 23 - 68 | 2 | 24" | 36" | 24" |
| > 68 | 3 | 30" | 48" | 36" |

① ALL METAL CONDUITS SHALL BE ELECTRICALLY BONDED BY A GROUND BUSHING AND #6 AWG BARE COPPER WIRE. FOR PVC CONDUIT, ALL GROUND WIRES SHALL BE CONNECTED.

② SIGNAL PULL BOXES SHALL BE EMBOSSED "STATE SIGNALS" AND LIGHTING PULL BOXES "STATE LIGHTING."

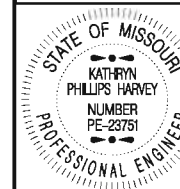
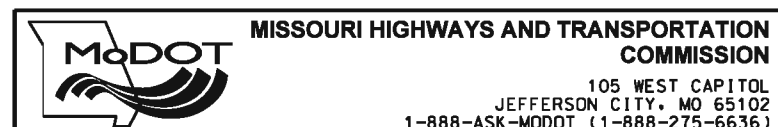
③ PULL BOX FRAMES AND COVERS SHALL BE CAST IRON AND THE FOLLOWING MINIMUM DIMENSIONS:

FRAME SIZE: 29" x 29"
FRAME HEIGHT: 4 1/4"
OPENING SIZE: 22 1/2" x 22 1/2"
FRAME WEIGHT: 120 LBS.
COVER SIZE: 22 5/8" x 22 5/8"
COVER THICKNESS: 3/4"
COVER WEIGHT: 140 LBS.

GENERAL NOTES:

IF AN EXTENSION IS USED WITH A PREFORMED BOX, THE LIP OF THE EXTENSION MAY BE INTERIOR OR EXTERIOR. THE EXTENSION SHALL BE COMPATIBLE AND FROM THE SAME MANUFACTURER.

IF PREFORMED PULL BOXES ARE SPECIFIED, THE CONTRACTOR MAY USE THE STANDARD CONCRETE PULL BOX IN LIEU OF THE CLASS 1 OR 2 PREFORMED PULL BOX OR THE DOUBLE CONCRETE PULL BOX, TYPE A, IN LIEU OF THE CLASS 3 PREFORMED PULL BOXES.



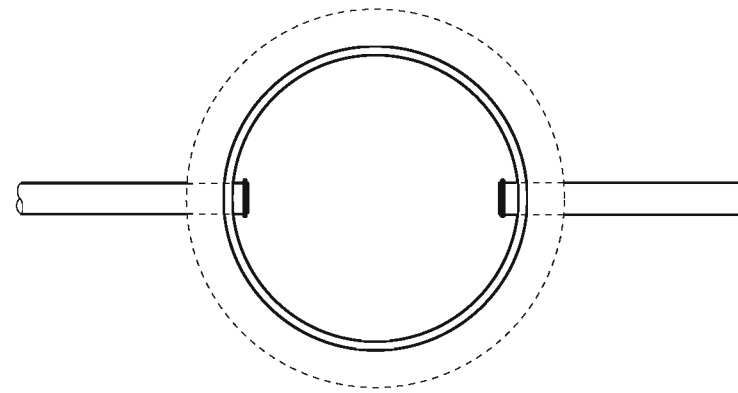
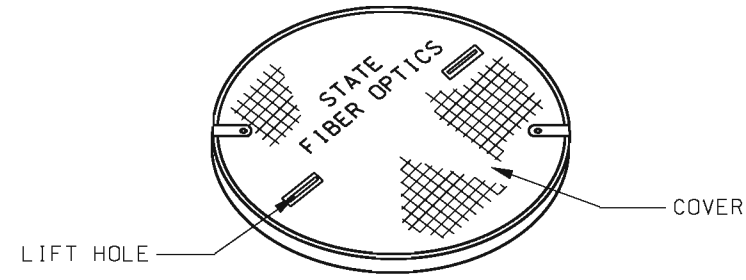
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ELECTRONICALLY.

TRAFFIC SIGNALS CONCRETE AND PREFORMED PULL BOXES

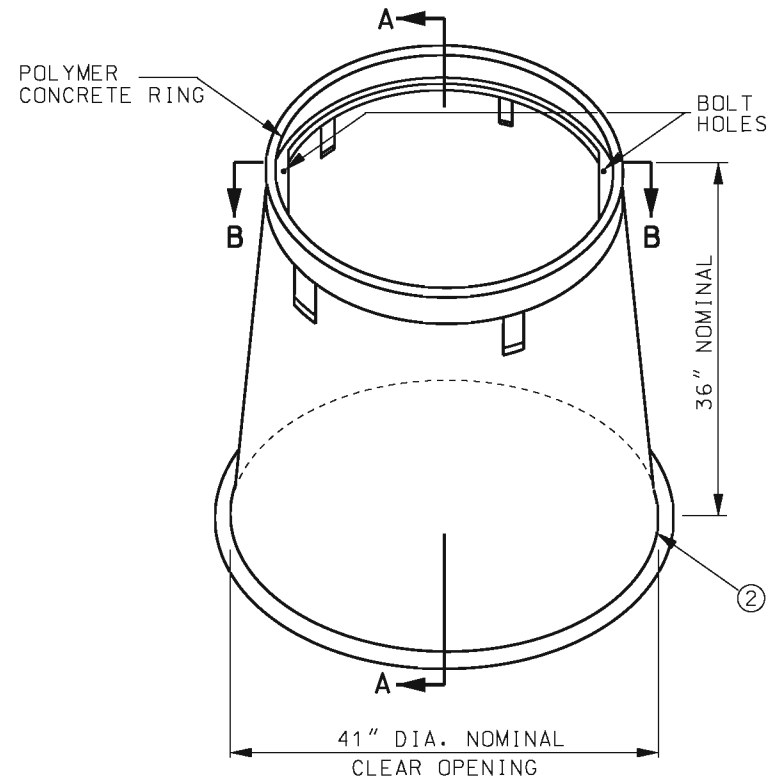
DATE EFFECTIVE: 11/01/2010
DATE PREPARED: 9/3/2010

902.20G

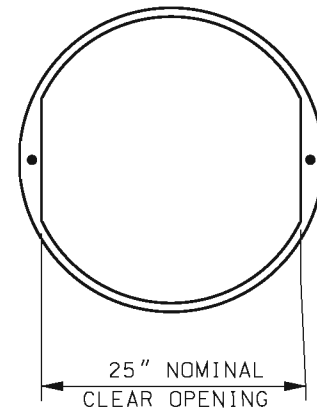
SHEET NO.
2 OF 3



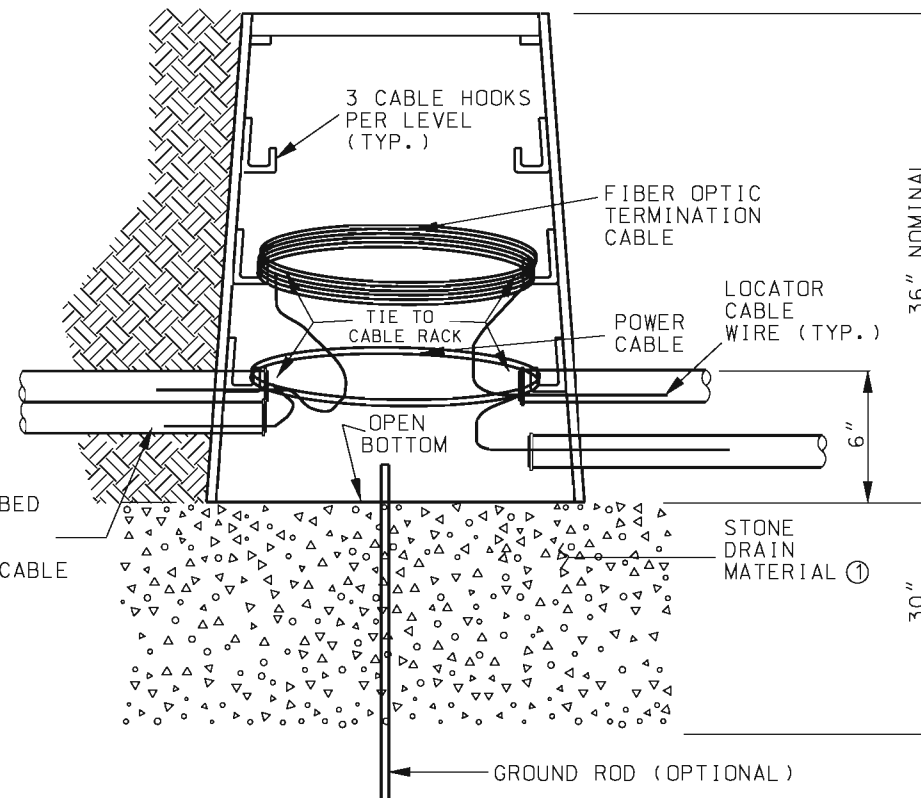
PLAN



CIRCULAR PULL BOX
CLASS 5



SECTION B-B



SECTION A-A
TYPE I DRAIN TYPE

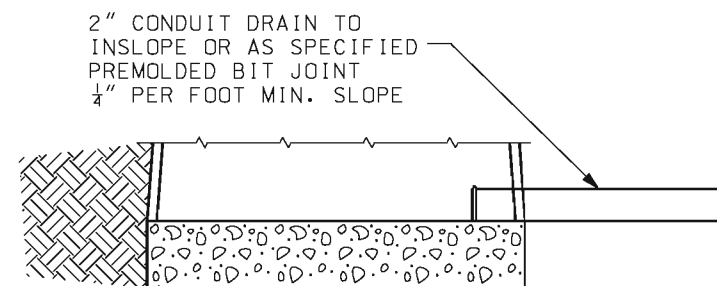
- ① AGGREGATE SHALL BE TYPE 1 CONFORMING TO SEC 1007.
- ② BOX SHALL BE OF A FLARE DESIGN AND HAVE A LIP FOR STABILIZATION.

GENERAL NOTES:

A MINIMUM OF NINE HOOKS, INSTALLED IN THREE LEVELS, SHALL BE INCLUDED WITH EACH PULL BOX.



IF SUBSURFACE CONDITIONS EXIST WHICH PROHIBIT THE PLACEMENT OF THE GROUND ROD IN A VERTICAL POSITION, THE ROD MAY BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45 DEGREES FROM VERTICAL OR BURIED IN A TRENCH AT LEAST 30 IN. DEEP. CONNECTION TO GROUND ROD SHALL BE CADWELDED.

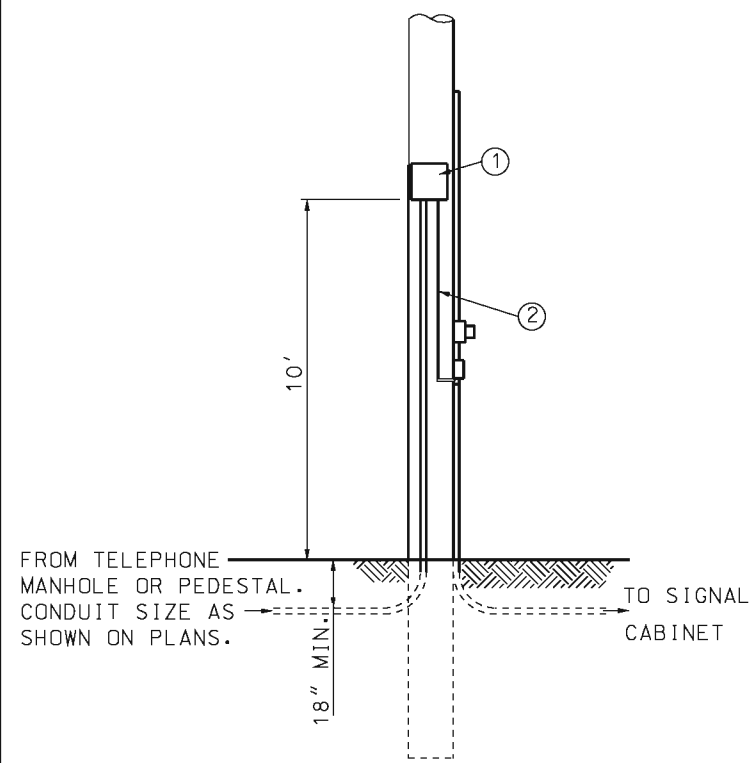
THE CIRCULAR PULL BOX COVER SHOULD BE SIZED TO FIT A BOX WITH A CLEAR OPENING OF 25".



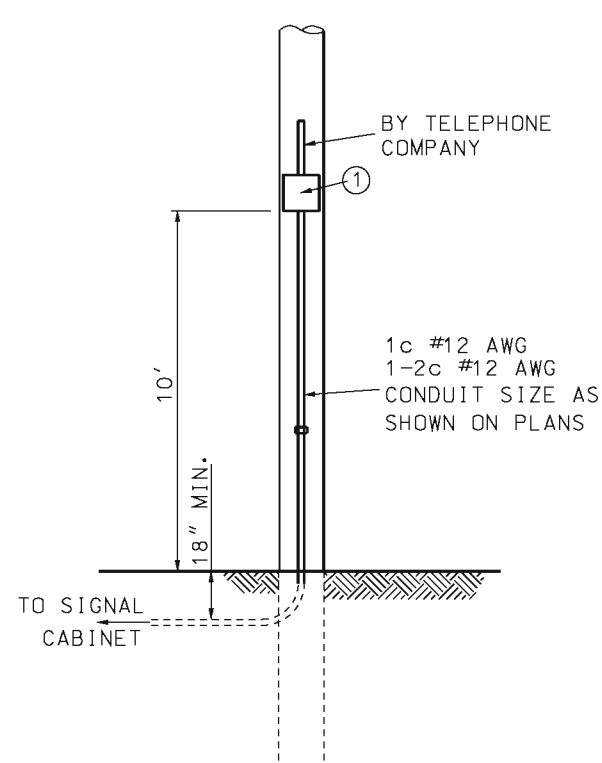
TYPE II DRAIN TYPE

(SEE DRAIN OUTLET DETAILS)
(SECTION ABOVE BREAK APPLICABLE TO TYPE I DRAIN.)

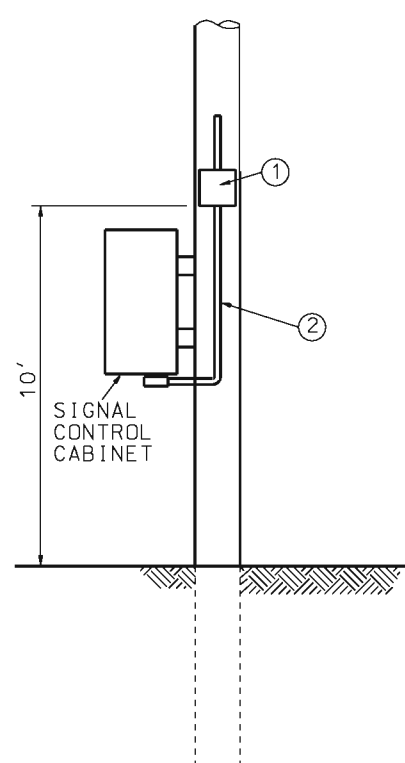
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TRAFFIC SIGNALS CONCRETE AND PREFORMED PULL BOXES |
| DATE EFFECTIVE: 11/01/2010 DATE PREPARED: 9/3/2010 | 902.20G |
| SHEET NO. 3 OF 3 | |



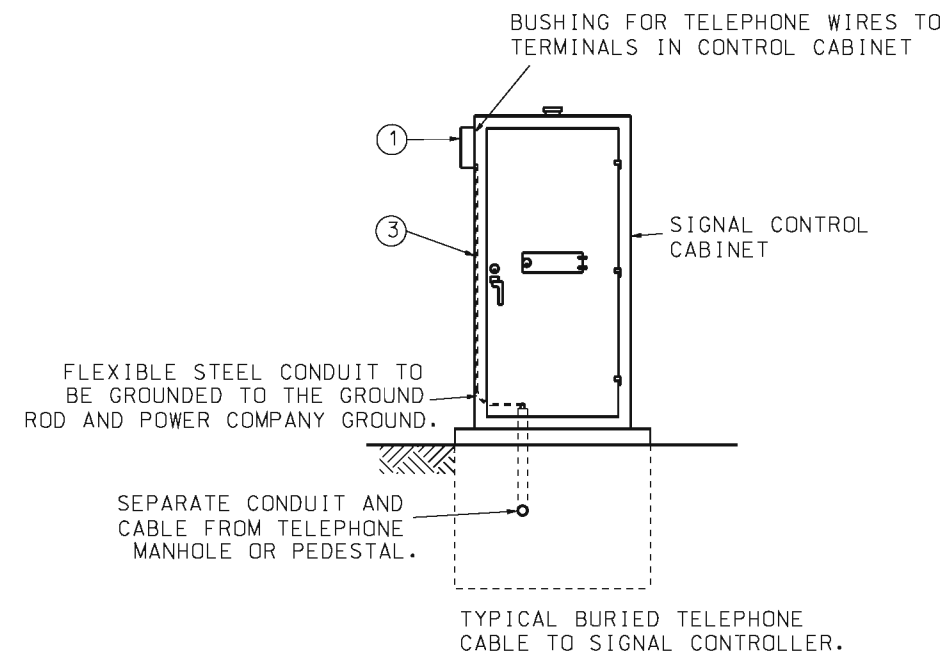
TYPE 902.10-U
USE ON EXISTING ONLY



TYPE TPA
USE ON NEW OR EXISTING

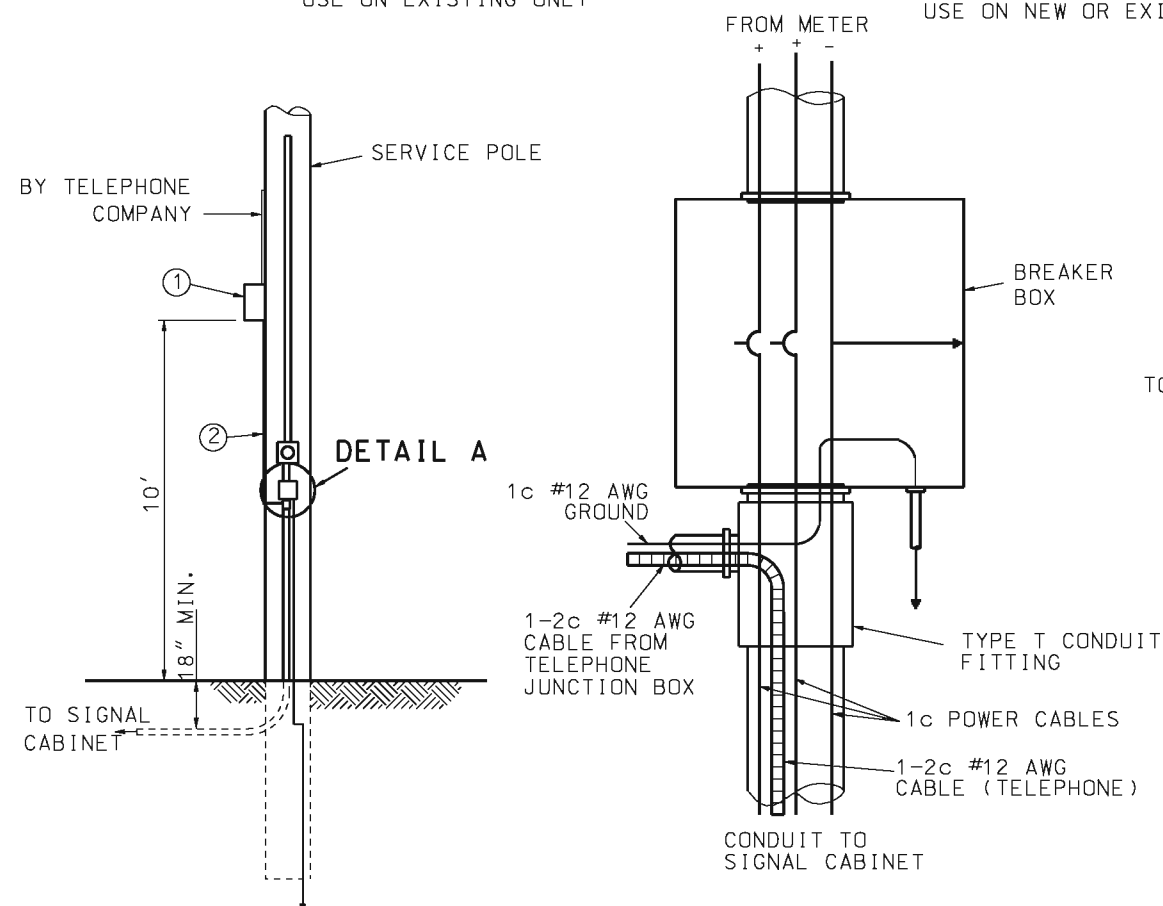


TYPE SWA
USE ON NEW OR EXISTING



TYPE CU
USE ON NEW ONLY

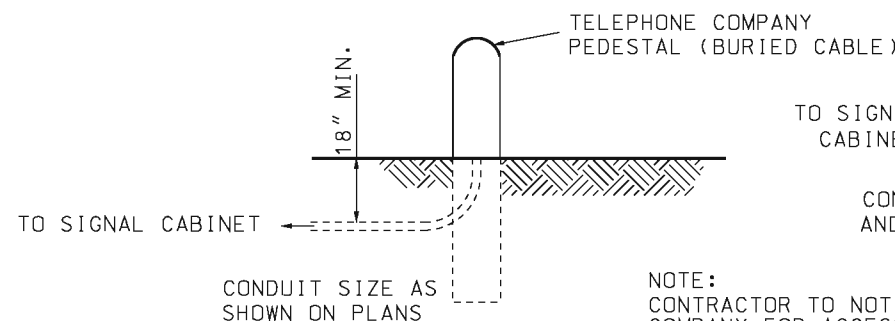
NOTE:
WIRING FROM TELEPHONE COMPANY PEDESTAL OR MANHOLE
WILL BE FURNISHED AND INSTALLED BY TELEPHONE COMPANY.



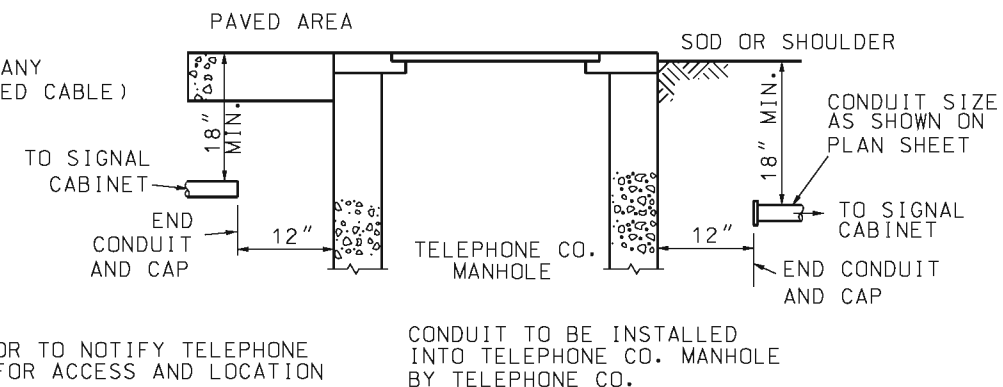
TYPE 902.10-A
USE ON EXISTING ONLY

DETAIL A

AERIAL TELEPHONE CONNECTION



TYPE CP
USE ON NEW OR EXISTING




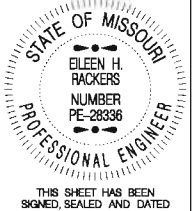
TYPE CM
USE ON NEW OR EXISTING

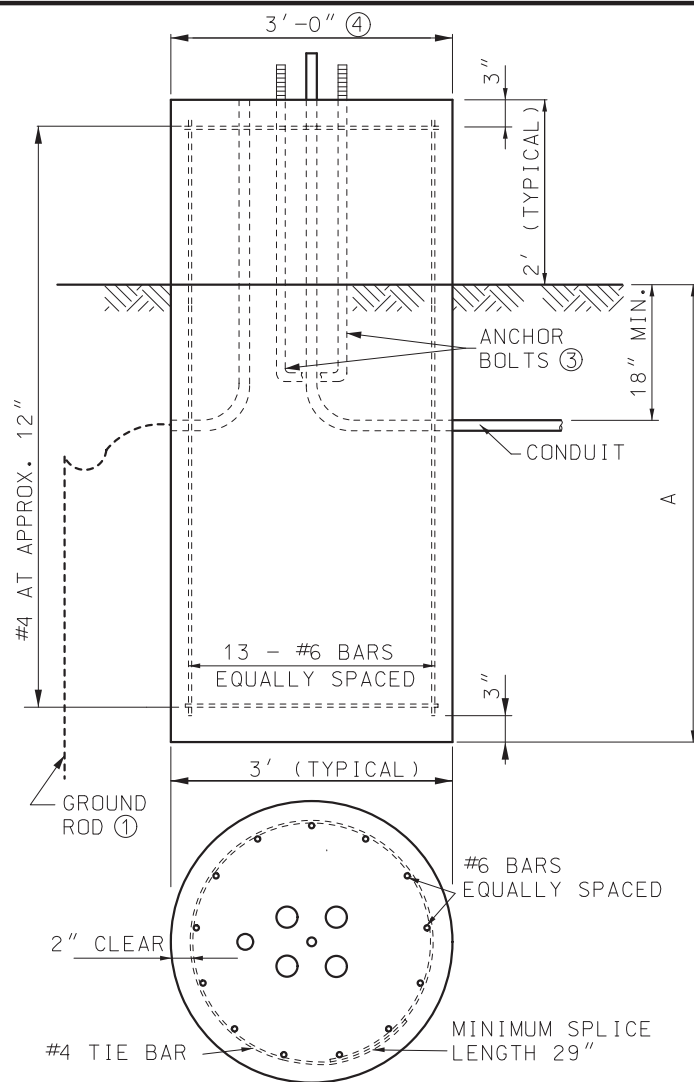
UNDERGROUND TELEPHONE CONNECTION

NOTE:
SCHEMATIC DIAGRAM APPLIES TO
STANDARD PLANS 901.80 AND 902.15.

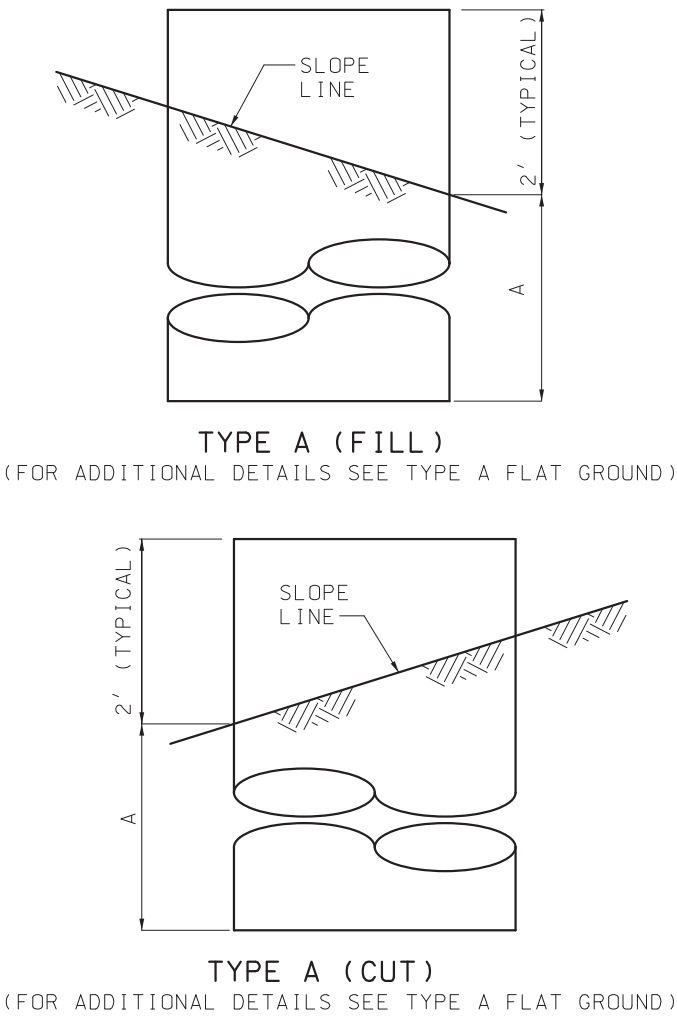
- ① 12" x 12" x 6" JUNCTION BOX WITH $\frac{3}{4}$ " TO 1 $\frac{1}{2}$ " KNOCK-OUT IN BOTTOM.
- ② $\frac{3}{4}$ " MINIMUM METAL CONDUIT CONTAINING 1-2c #12 AWG AND 1c #12 AWG.
- ③ $\frac{3}{4}$ " MINIMUM FLEXIBLE CONDUIT CONTAINING 1-2c #12 AWG AND 1c #12 AWG.

ALL ITEMS CONTRACTOR FURNISHED AND INSTALLED.

| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | TRAFFIC SIGNALS TELEPHONE INTERCONNECT |
| DATE EFFECTIVE: 03/01/1996 DATE PREPARED: 8/26/2009 | 902.21C |
| SHEET NO. 1 OF 1 | |



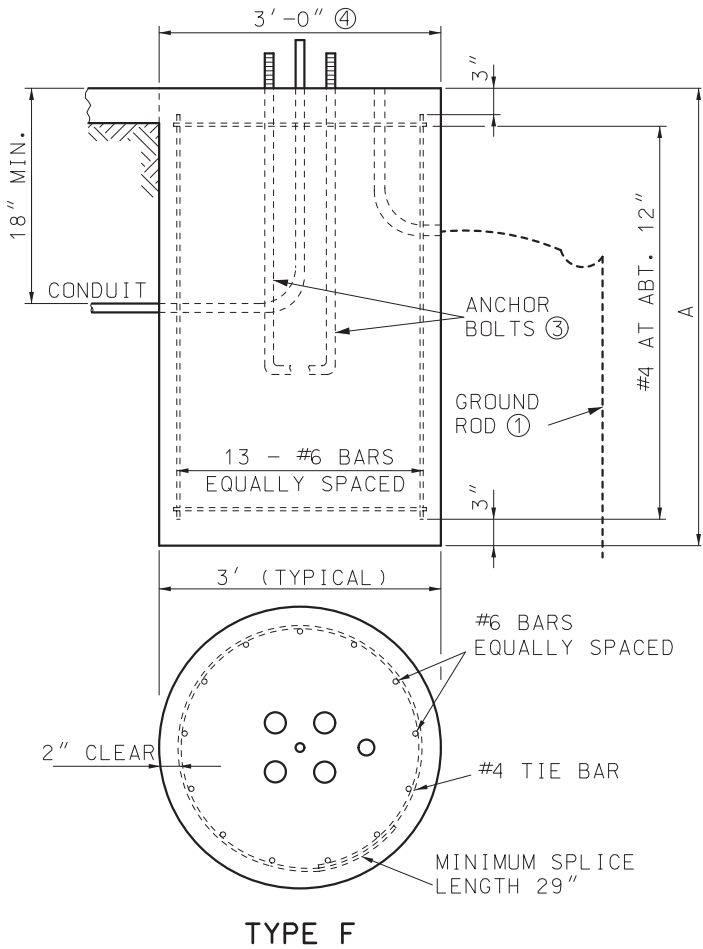
TYPE A (FLAT GROUND)



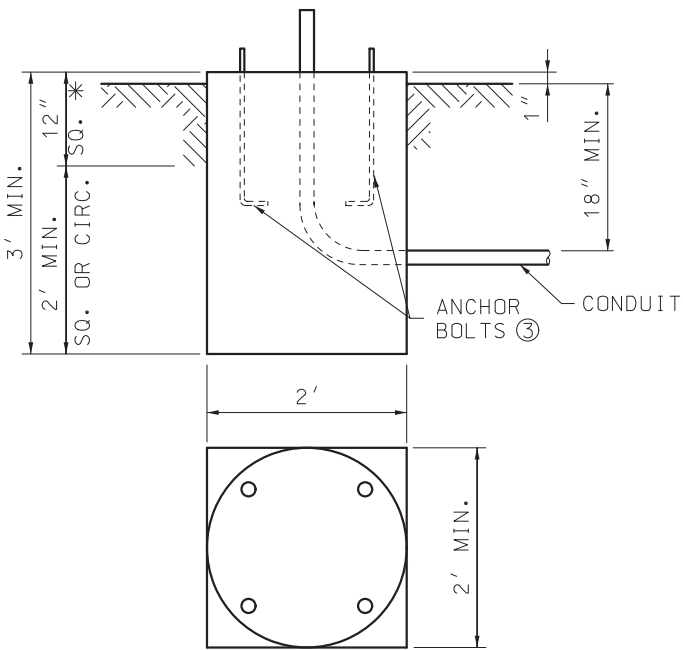
POST BASES

| STEEL AND CONCRETE REQUIREMENTS FOR POST BASES ^⑨ | | | | |
|---|--------|--------------|------------------|---------------|
| BASES | | #6 STEEL BAR | | CONC. C.Y. |
| TYPE | A ⑦ | LENGTH | WEIGHT LBS. ⑧ | |
| A-9 | 9'-0" | 10'-6" | 300 | 2.88 |
| A-9.5 | 9'-6" | 11'-0" | 310 | 3.01 |
| A-10 | 10'-0" | 11'-6" | 320 | 3.14 |
| A-10.5 | 10'-6" | 12'-0" | 330 | 3.27 |
| A-11 | 11'-0" | 12'-6" | 350 | 3.40 |
| A-12 | 12'-0" | 13'-6" | 380 | 3.67 |
| F-9 | 9'-0" | 8'-6" | 240 | 2.36 |
| F-9.5 | 9'-6" | 9'-0" | 250 | 2.49 |
| F-10 | 10'-0" | 9'-6" | 270 | 2.62 |
| F-10.5 | 10'-6" | 10'-0" | 280 | 2.75 |
| F-11 | 11'-0" | 10'-6" | 300 | 2.88 |
| F-12 | 12'-0" | 11'-6" | 320 | 3.14 |
| C* | | | | 0.44 |

* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".



TYPE F




TYPE C

* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

- ① APPLICABLE ONLY WHERE CONTROLLER IS MOUNTED TO A SIGNAL POLE.
- ② BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ③ ANCHOR BOLT DIMENSIONS ARE SHOWN ON THE MANUFACTURER'S APPROVED DRAWINGS.
- ④ MAXIMUM BOLT CIRCLE DIAMETER IS 26". BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ⑤ ARM LENGTH DETERMINED BY LENGTH OF LONGEST ARM FOR TYPE B & BL SIGNAL POSTS.
- ⑥ BASE TYPE A OR F DETERMINED BY LOCATION OF POST BASE.
- ⑦ SOIL DEPTH, NO ROCK.
- ⑧ WEIGHT INCLUDES #4 TIE BARS.
- ⑨ WHEN CONCRETE BASE IS LOCATED WITHIN 8" CONCRETE DIVISIONAL ISLAND, EMBEDMENT LENGTH MAY BE REDUCED BY 1/2 DIAMETER OF THE DRILLED SHAFT.


| POST BASES | | |
|------------|---------------------|------------------|
| POST TYPE | ARM LENGTH (FEET) ⑤ | BASE TYPE ⑥ |
| C OR CL | 15 - 25 | A-9 OR F-9 |
| C OR CL | 30 - 35 | A-9.5 OR F-9.5 |
| C OR CL | 40 - 55 | A-10.5 OR F-10.5 |
| B OR BL | 15 - 25 | A-10 OR F-10 |
| B OR BL | 30 - 35 | A-11 OR F-11 |
| B OR BL | 40 - 55 | A-12 OR F-12 |

| BASE EMBEDMENT IN SOLID ROCK | |
|---|----------------------------------|
| SOLID ROCK ENCOUNTER POINT | REQUIRED EMBEDMENT FOR BASE TYPE |
| | A-10 F-10 |
| AT SURFACE | 4'-9" |
| AT ONE-FOURTH NORMAL DEPTH | 4'-0" |
| AT ONE-HALF NORMAL DEPTH | 3'-3" |
| AT THREE-FOURTHS NORMAL DEPTH | 1'-3" |
| 1. REQUIRED EMBEDMENT DEPTHS CAN BE INTERPOLATED BETWEEN ENCOUNTER POINTS FOR OTHER SOLID ROCK ENCOUNTER DEPTHS. | |
| 2. NORMAL LENGTHS FOR ANCHOR BOLTS AND REINFORCING STEEL WILL BE REQUIRED. | |
| 3. CORE DRILL HOLES FOR ANCHOR BOLTS AND REINFORCING STEEL IN SOLID ROCK SHALL BE PROVIDED. CORE DRILL HOLES SHALL BE TWICE THE DIAMETER OF THE ANCHOR BOLT AND REINFORCING STEEL DIAMETER AND TO WITHIN 3 INCHES OF THE NORMAL BASE DEPTH. | |
| 4. IF SOIL, SHALE, GRAVEL, FRACTURED ROCK, OR VOIDS ARE ENCOUNTERED DURING CORE DRILLING, THE ROCK SHALL BE REMOVED TO THE POINT OF ENCOUNTER. | |
| 5. ANCHOR BOLTS AND REINFORCING STEEL SHALL BE GROUTED IN THE CORE DRILL HOLES WITH NON-SHRINK GROUT HAVING A MINIMUM STRENGTH OF 9,000 POUNDS IN 24 HOURS. | |
| 6. STRAIGHT ANCHOR BOLTS OF THE LENGTH SHOWN IN THE ANCHOR BOLT TABLE UNDER THE COLUMN "BOLT LENGTH" ARE ADEQUATE FOR USE IN GROUTED CORE DRILLED HOLES. | |



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER
PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

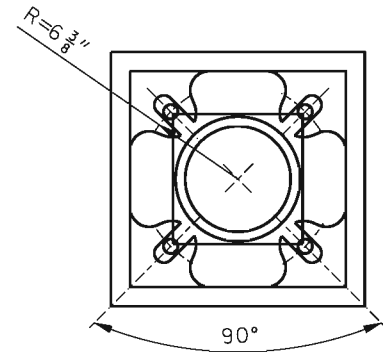
TRAFFIC SIGNALS
POST BASES

DATE EFFECTIVE: 07/01/2019
DATE PREPARED: 5/20/2019

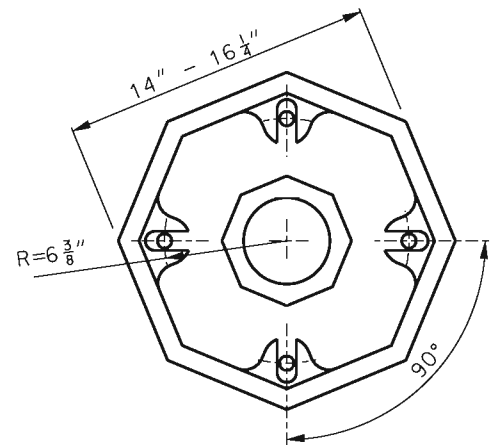
902.30P

SHEET NO.
1 OF 2

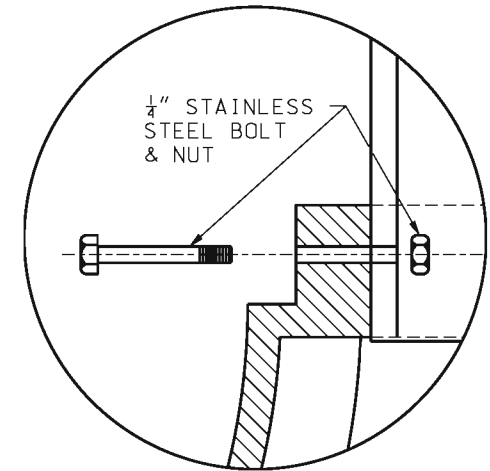
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



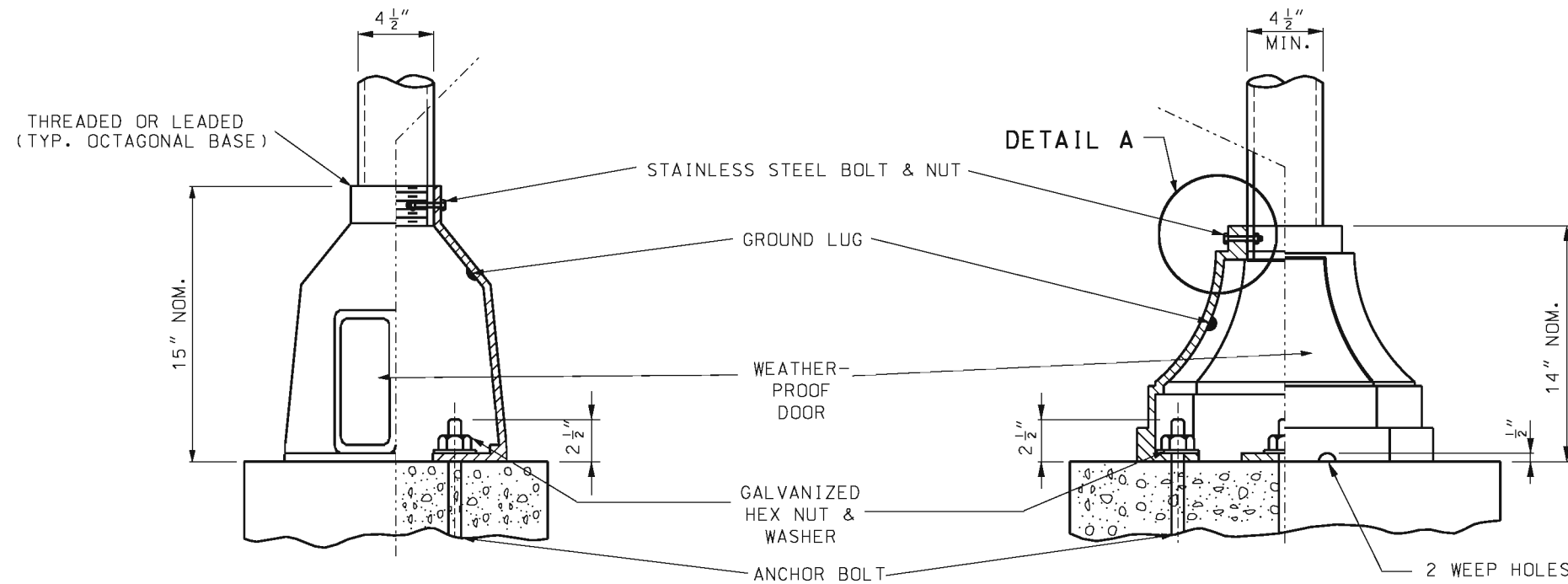
BOLT CIRCLE



BOLT CIRCLE

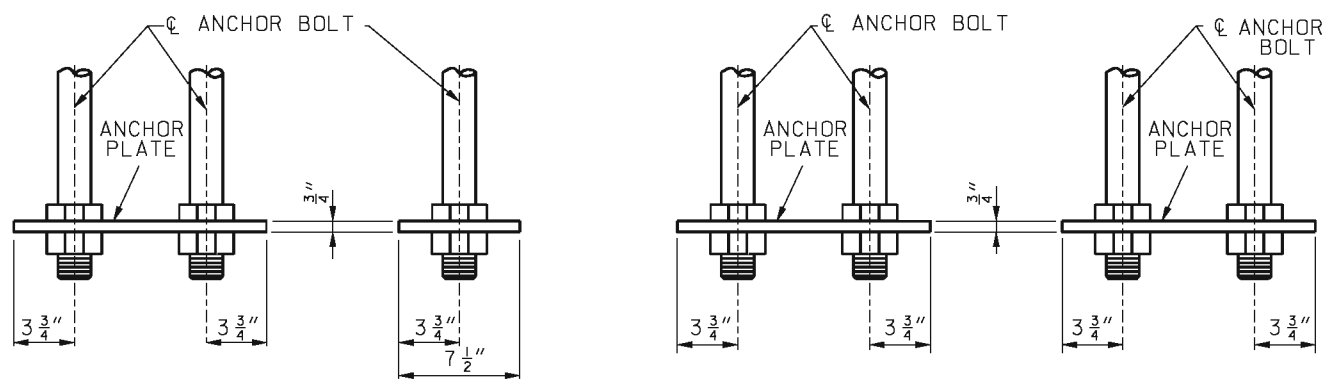


DETAIL A

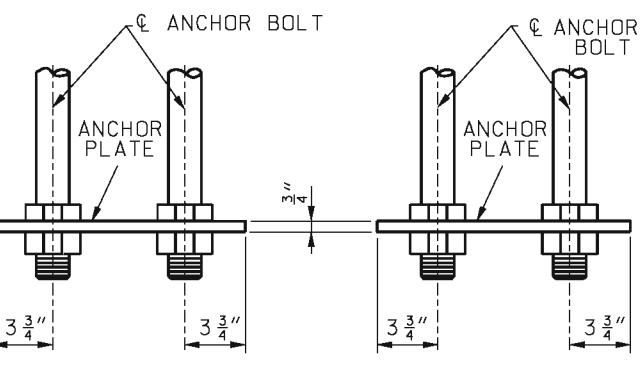


CAST BASE

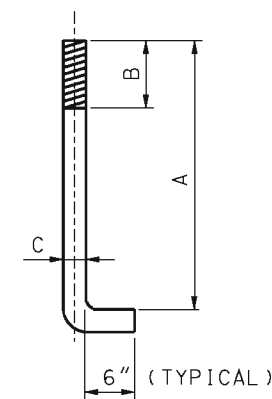
| BOLT LENGTH INCHES | VERT. HT. A INCHES | THREAD LEN. B INCHES | DIA. C INCHES |
|-----------------------|-----------------------|-------------------------|------------------|
| 19 | 17 | 1.50 | 0.625 |
| 57 | 51 | 7.00 | 1.250 |
| 79 | 73 | 7.50 | 1.500 |
| 94 | 88 | 8.00 | 1.750 |
| 121 | 115 | 8.50 | 2.000 |
| 120 | 114 | 9.00 | 2.250 |
| 146 | 140 | 9.50 | 2.500 |



SIDE VIEW END VIEW



SIDE VIEW END VIEW



ANCHOR BOLT

NOTE:
ALL ANCHOR BOLTS SHALL BE FULLY GALVANIZED.

OPTIONAL STEEL PLATE FOR ANCHOR BOLTS

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105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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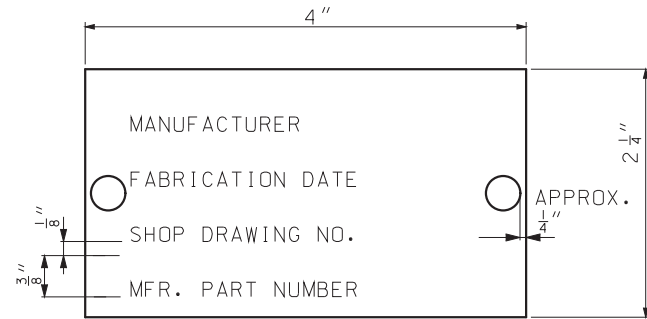
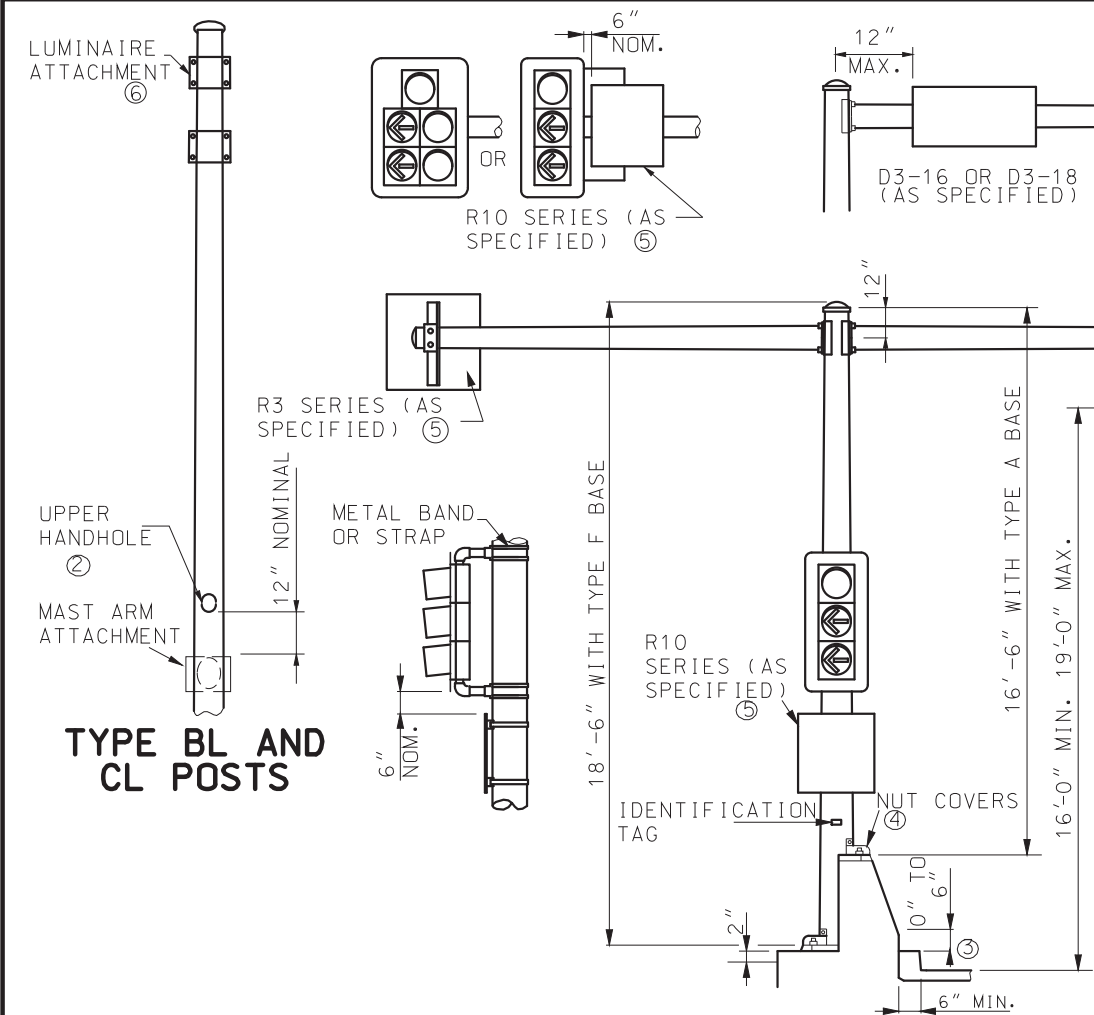
**TRAFFIC SIGNALS
POST BASES**

DATE EFFECTIVE: 02/01/2008
DATE PREPARED: 8/26/2009

902.30P

SHEET NO.
2 OF 2

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



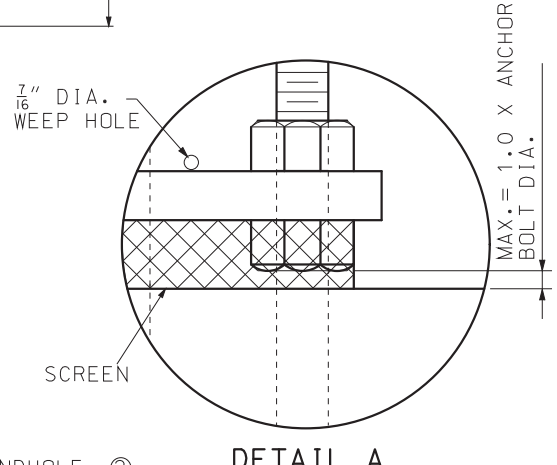
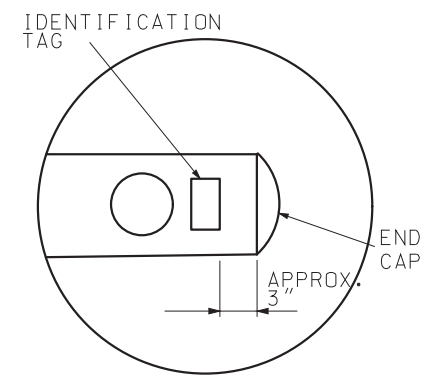
IDENTIFICATION TAG

ID TAG NOTE:

TAG SHALL BE ALUMINUM OR STAINLESS STEEL AND ATTACHED TO POLE OR MAST ARM USING TWO RIVETS OR STAINLESS STEEL DRIVE SCREWS. ID TAG HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

- ARM LENGTHS SHALL NOT EXCEED 55 FEET.
- HANDHOLES SHALL BE APPROXIMATELY 4" x 6 1/2". HANDHOLE FRAME SHALL BE REINFORCED SO THAT THE POLE STRENGTH IS NOT REDUCED.
- 0" TO 6" VARIATION IN BASE HEIGHT IS FOR OBTAINING 16'-0" CLEARANCE. 0.13 C.Y. CONCRETE AND 3 LBS. REINFORCING STEEL PER 6".
- POSTS SHALL BE FURNISHED WITH INDIVIDUAL NUT COVERS.
- NO SIGN IN EXCESS OF 15.0 SQUARE FEET SHALL BE INSTALLED ON POSTS OR MAST ARMS. SIGNS EXCEEDING 8.0 SQUARE FEET SHALL BE LOCATED SO THAT THE EDGE OF THE SIGN IS NO MORE THAN 12" FROM THE CENTERLINE OF THE POST. D3 SERIES SIGNS, AS WELL AS SIGNS INSTALLED ON THE POST, SHALL BE MOUNTED WITH A STRAP TYPE SIGN SUPPORT. R10 SERIES SIGNS INSTALLED ON THE MAST ARM SHALL BE MOUNTED WITH A SIGN BRACKET ASSEMBLY.

- SEE DRAWING 901.00 FOR TYPICAL BRACKET ARM MOUNTING FOR TYPE BL AND TYPE CL POSTS.
- A GALVANIZED SCREEN SHALL BE USED BETWEEN THE POST BASE PLATE AND CONCRETE BASE. SCREENS SHALL BE PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE OR HEAVIER, STAINLESS STEEL OR HOT-DIPPED GALVANIZED WIRE SCREEN OR APPROVED EQUIVALENT, THAT WILL PROVIDE A FRICTION-TIGHT FIT WHEN INSTALLED.
- POST SHALL BE GROUNDED FROM GROUND LUG IN POST WITH # 6 AWG BARE COPPER WIRE TO CONDUIT SYSTEM. GROUND LUG SHALL BE 90° OR 180° FROM THE HANDHOLE.



GENERAL NOTES:

ARMS SHALL BE RAKED UP 0.25" PER FOOT MINIMUM. ARMS SHALL BE PROVIDED WITH A PERMANENT MARKING INDICATING PROPER ORIENTATION FOR INSTALLATION.

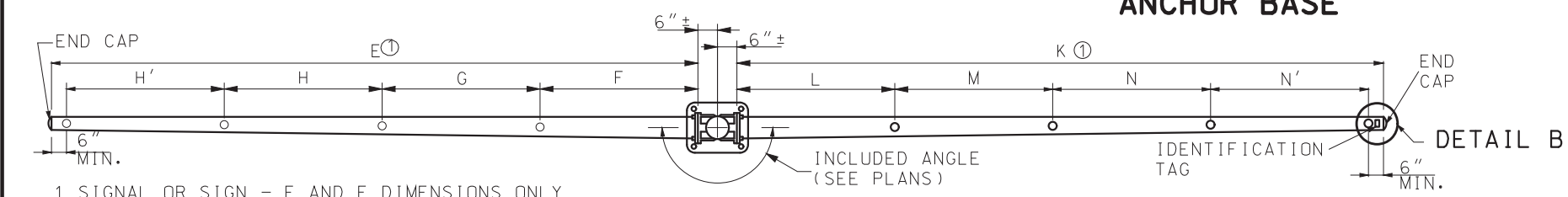
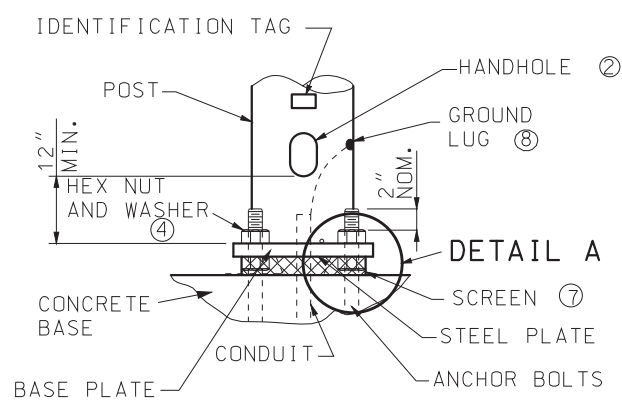
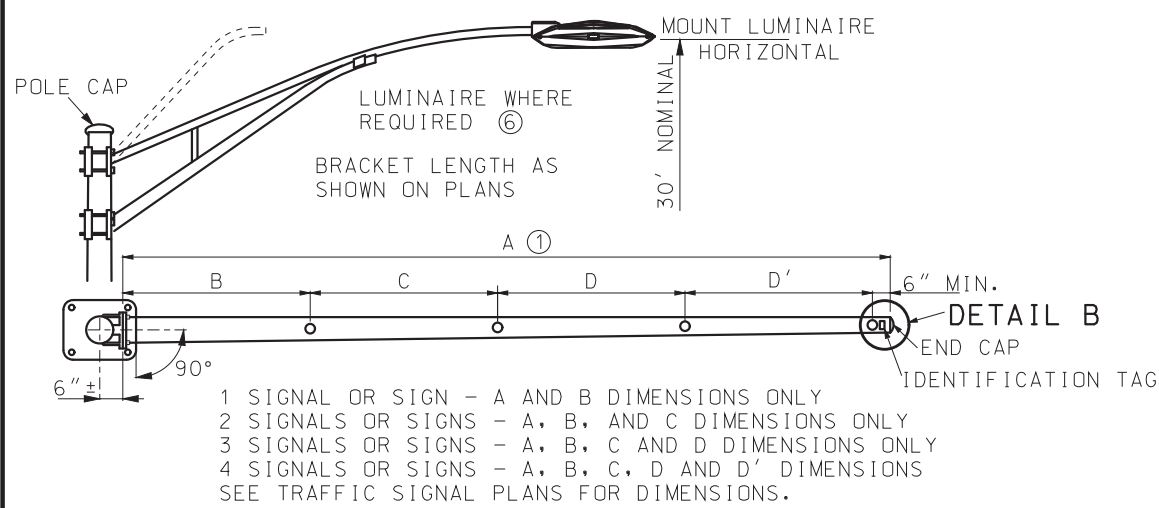
SIGNS AND SIGNALS SHALL BE VERTICAL. SIGNAL HEADS ON MAST ARMS SHALL BE TILTED FORWARD FROM THE TOP 3 TO 7 DEGREES FROM VERTICAL.

IF A SIGN EXCEEDS 42" IN LENGTH, TWO STRAP SUPPORTS ARE REQUIRED: AND IF A SIGN EXCEEDS 96" IN LENGTH, THREE STRAP SUPPORTS ARE REQUIRED.

TO DETERMINE LEFT OR RIGHT ON TYPE B OR C SIGNAL POST, VIEWING POSITION SHALL BE FROM THE CENTER OF THE INTERSECTION BEING CONTROLLED AND FACING THE SIGNAL INVOLVED.

TRAFFIC SIGNALS MOUNTED ON MAST ARMS SHALL BE FURNISHED WITH MOUNTING BRACKETS UTILIZING CABLES.

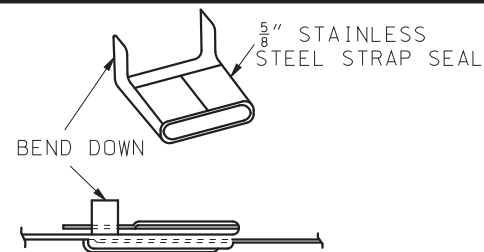
SEE STANDARD 902.30 FOR FOUNDATION AND ANCHOR BOLT DETAILS.



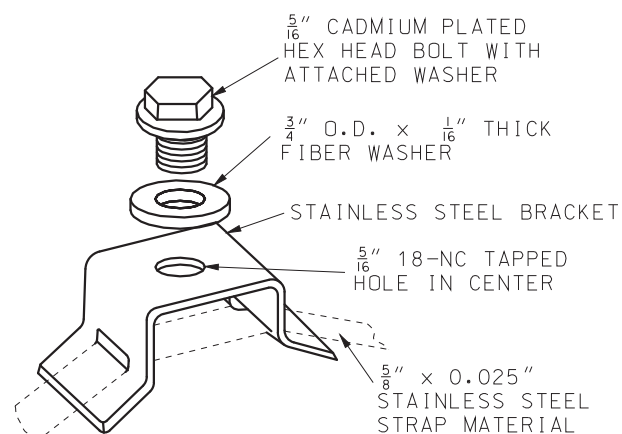
- SIGNAL OR SIGN - K AND L DIMENSIONS ONLY
 - SIGNALS OR SIGNS - K, L, AND M DIMENSIONS ONLY
 - SIGNALS OR SIGNS - K, L, M, AND N DIMENSIONS ONLY
 - SIGNALS OR SIGNS - K, L, M, N AND N' DIMENSIONS
- SEE TRAFFIC SIGNAL PLANS FOR DIMENSIONS

| | |
|--|---|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI ERIC E. SCHROETER NUMBER PE-28411 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>TRAFFIC SIGNALS</p> <p>TUBULAR STEEL POSTS</p> |
| <p>DATE EFFECTIVE: 04/01/2018</p> <p>DATE PREPARED: 2/9/2018</p> | <p>902.40R</p> |
| <p>SHEET NO. 1 OF 3</p> | |

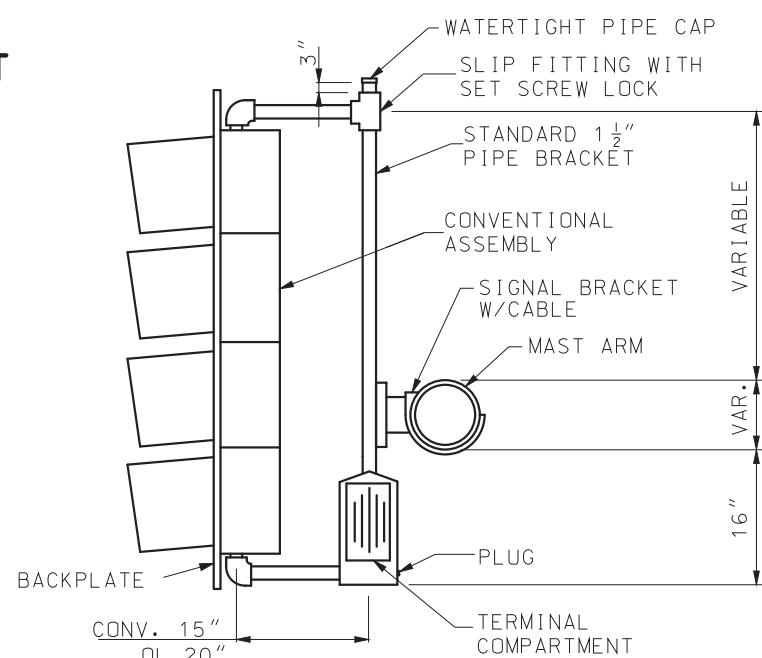
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



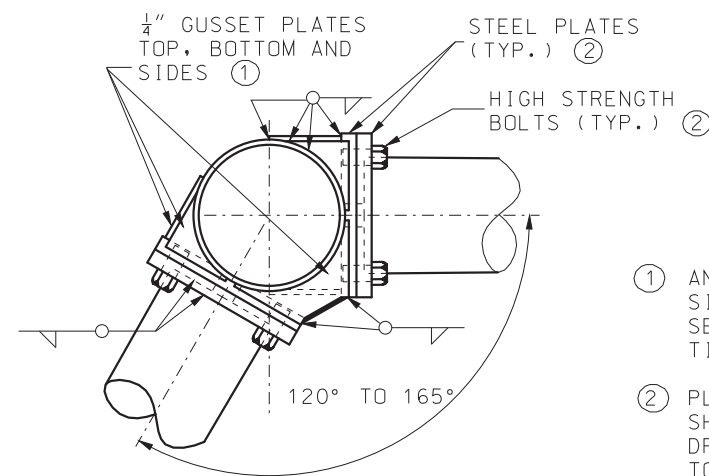
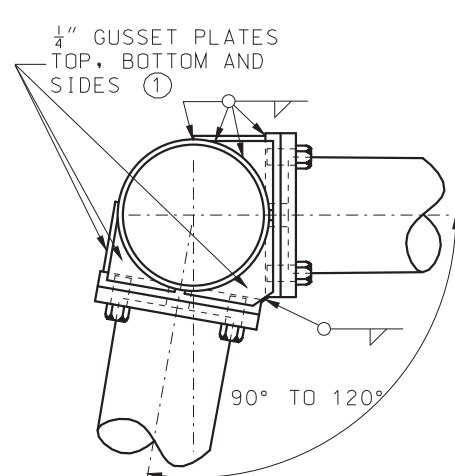
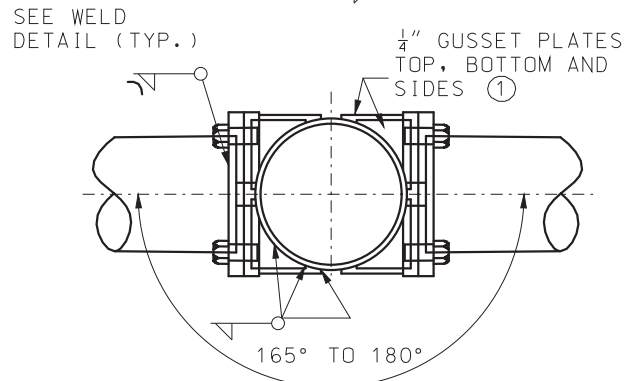
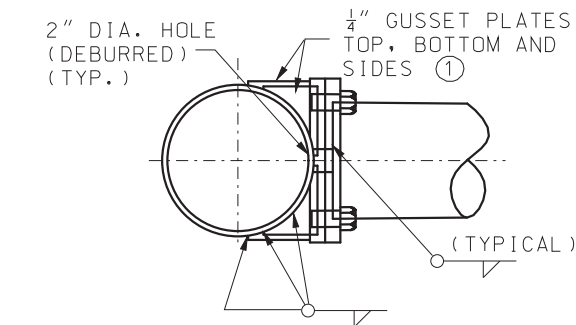
VIEW SHOWING
ENDS OF STRAP
CLAMPED IN SEAL



STRAP TYPE
SIGN SUPPORT

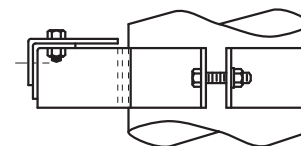


MAST ARM MOUNTED
SIGNAL HEAD
(SEE STANDARD 902.00)

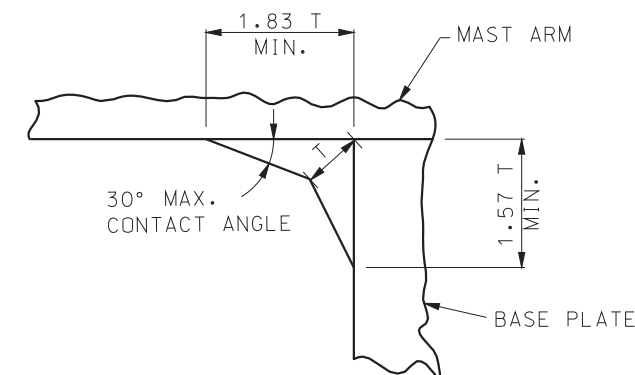


- ① ANY OPENINGS BETWEEN TOP AND SIDE GUSSET PLATES SHALL BE SEALED WITH LIFETIME CAULK AT TIME OF INSTALLATION.
- ② PLATE AND BOLT SIZES SHALL BE SHOWN ON FABRICATORS SHOP DRAWINGS AND SHALL BE SUBJECT TO APPROVAL.

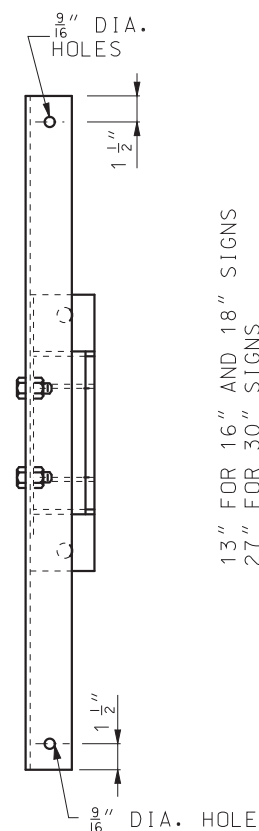
ARM ATTACHMENTS



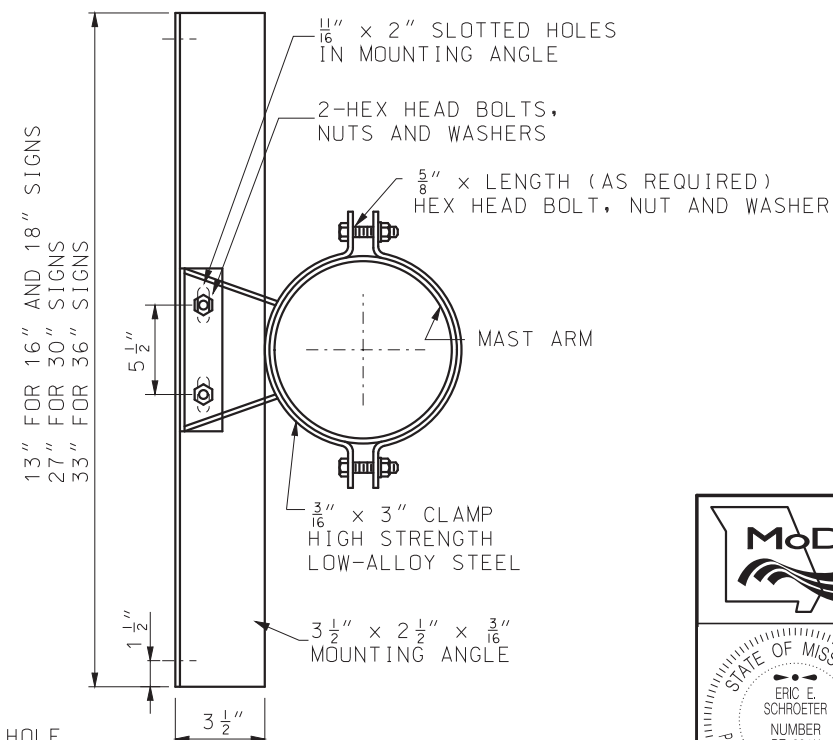
TOP VIEW



WELD DETAIL




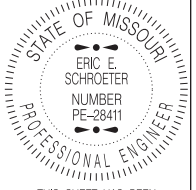
FRONT VIEW

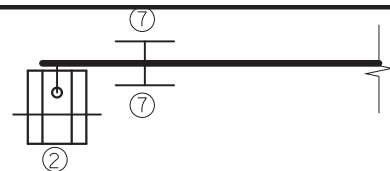


SIDE VIEW

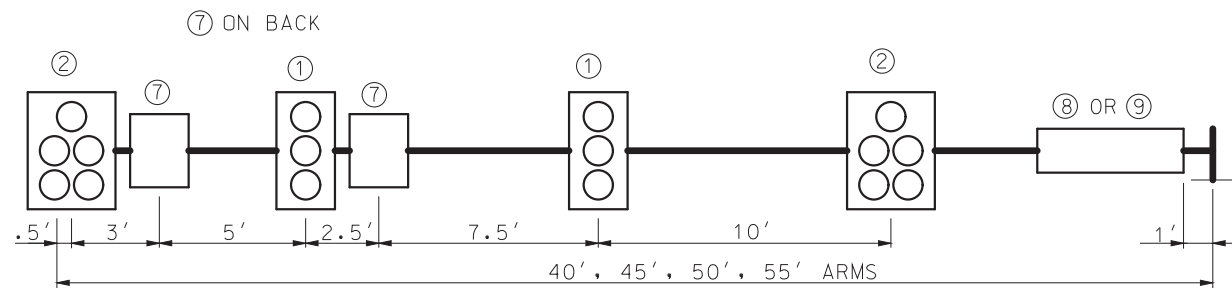
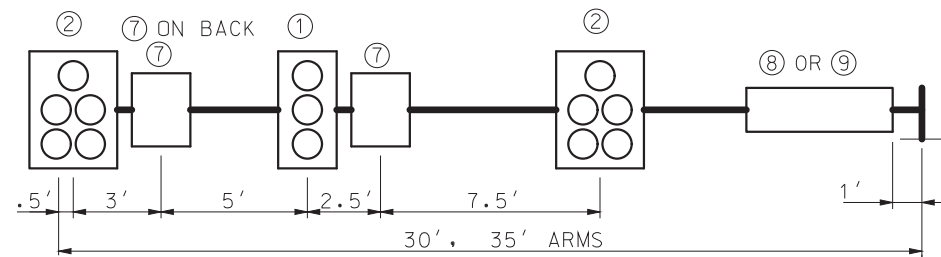
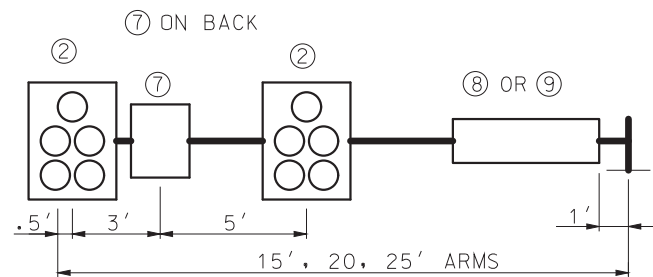
SIGN BRACKET ASSEMBLY

ALTERNATE DESIGN MAY BE PROVIDED
AS APPROVED BY ENGINEER

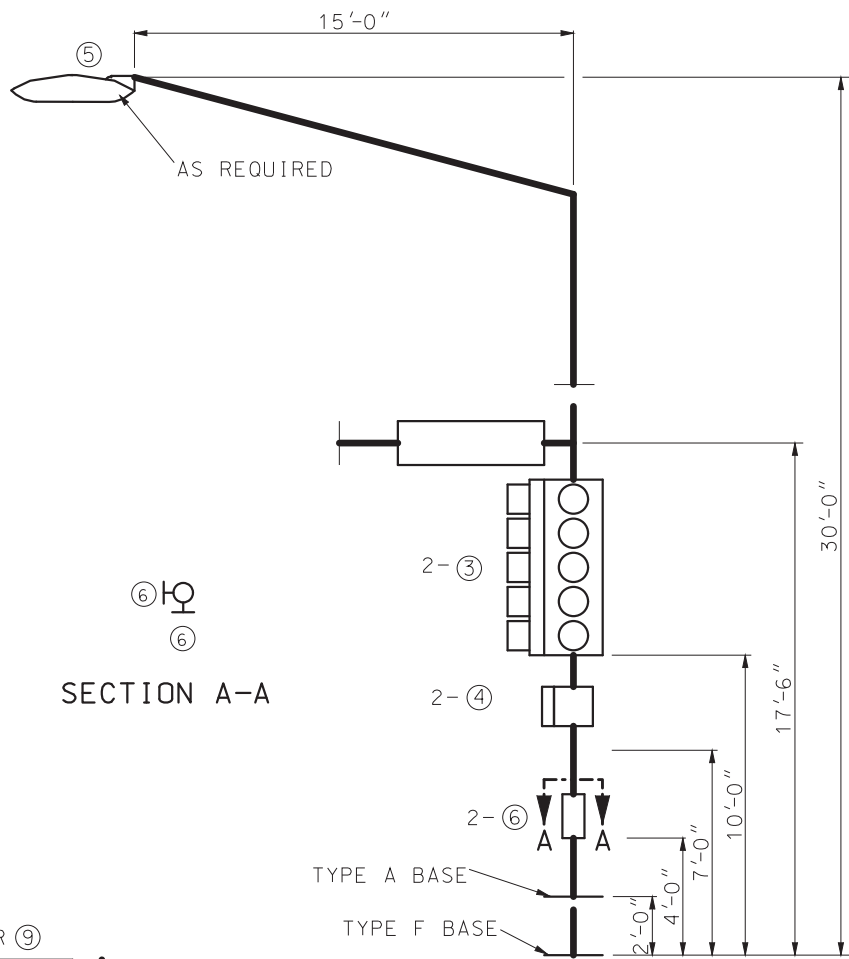
| | |
|--|---------------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  TRAFFIC SIGNALS TUBULAR STEEL POSTS | |
| DATE EFFECTIVE: 04/01/2018 DATE PREPARED: 2/9/2018 | 902.40R SHEET NO. 2 OF 3 |



TYPICAL TOP VIEW

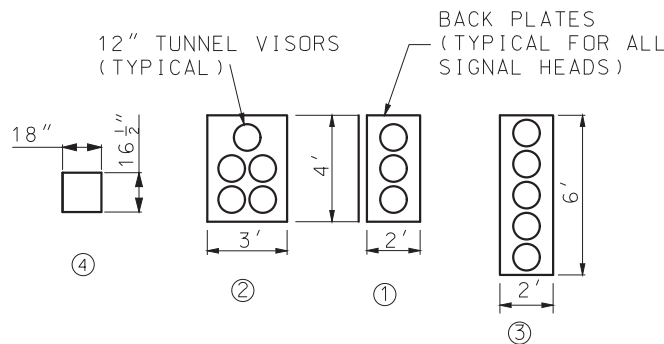


MAST ARM LOADING



SECTION A-A

TYPICAL POST LOADING



MINIMUM DESIGN LOADING FOR POST AND MAST ARM ATTACHMENTS

| ITEM NO. | DESCRIPTION | WEIGHT (LBS.)* | PROJ. AREA (SQ.FT.) | SURFACE AREA (SQ.FT.) |
|----------|-----------------------|----------------|---------------------|-----------------------|
| ① | 3-SECTION OL HEAD | 95.0 | 8.0 | 32.5 |
| ② | 5-SECTION OL HEAD | 173.0 | 12.0 | 47.5 |
| ③ | VERT. 5-SECT. OL HEAD | 100.0 | 12.0 | 50.5 |
| ④ | 1-SECTION PED HEAD | 15.0 | 2.0 | XX.X |
| ⑤ | LED-A LUMINAIRE | 30.0 | 1.0 | 3.5 |
| ⑥ | 9" X 12" SIGN | 2.0 | 0.8 | N/A |
| ⑦ | 30" X 36" SIGN | 13.0 | 7.5 | N/A |
| ⑧ | 120" X 18" SIGN | 25.0 | 15.0 | N/A |
| ⑨ | 96" X 16" SIGN | 18.0 | 10.7 | N/A |
| | 96" X 18" SIGN | 20.0 | 12.0 | N/A |

OL- OPTICALLY LIMITED
* MOUNTING HARDWARE INCLUDED

STRUCTURAL DESIGN REQUIREMENTS:

STRUCTURAL SUPPORTS SHALL BE DESIGNED AND FABRICATED TO WITHSTAND THEIR OWN LOADING AND THE ATTACHMENT LOADING SHOWN ON THIS DRAWING OR ON THE PLANS, WHICHEVER IS GREATER. STRUCTURAL MEMBERS INCLUDE POSTS, MAST ARMS AND LUMINAIRE BRACKET ARMS, AS REQUIRED.

DESIGN OF STRUCTURAL SUPPORTS SHALL BE BASED ON AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS, 1994 OR LATEST REVISION, WITH THESE EXCEPTIONS:

MINIMUM DESIGN WIND SPEED OF 90 MPH AT 30 FEET ABOVE GROUND.

| GROUP LOADING: | PERCENT OF ALLOWABLE STRESS (ALL MATERIALS) |
|---------------------------------|---|
| LOADS | |
| GROUP I - DL | 100 |
| GROUP II - DL + W | 133 |
| GROUP III - DL + ICE + 0.5(W**) | 133 |

* NO LOAD REDUCTION FACTORS SHALL BE APPLIED IN CONJUNCTION WITH THESE INCREASED ALLOWABLE STRESSES.
** W TO BE COMPUTED ON THE BASIS OF THE WIND PRESSURE FORMULA, 25 PSF (1197 Pa) MINIMUM FOR W FOR GROUP III.

FOR TYPE B AND BL POSTS, ICE AND DEAD LOADING SHALL BE BASED ON THE COMBINED EFFECT OF DESIGN LOADING ON EACH ARM. WIND LOADING IS APPLIED AS DESCRIBED IN SECTION 1.2.5(5)(b) OF THE STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS, 1994 REVISION.

GENERAL NOTES:

ATTACHMENT LOCATIONS ARE FOR STRUCTURAL DESIGN PURPOSES ONLY. ACTUAL LOCATIONS ARE SHOWN ON THE PLANS.

LUMINAIRE PER MODOT'S STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

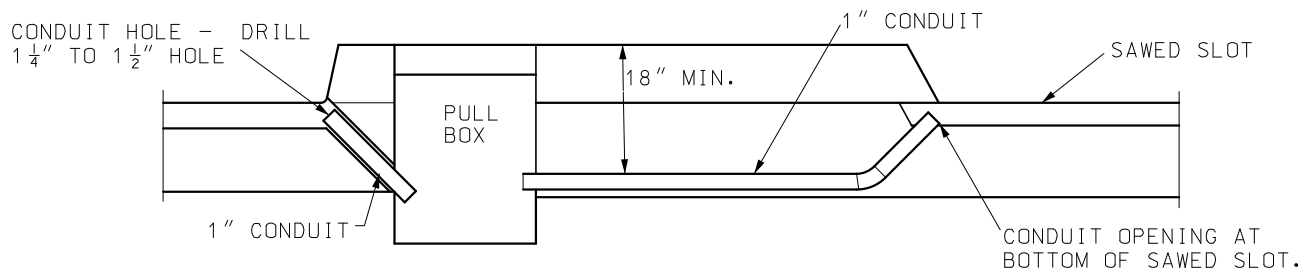
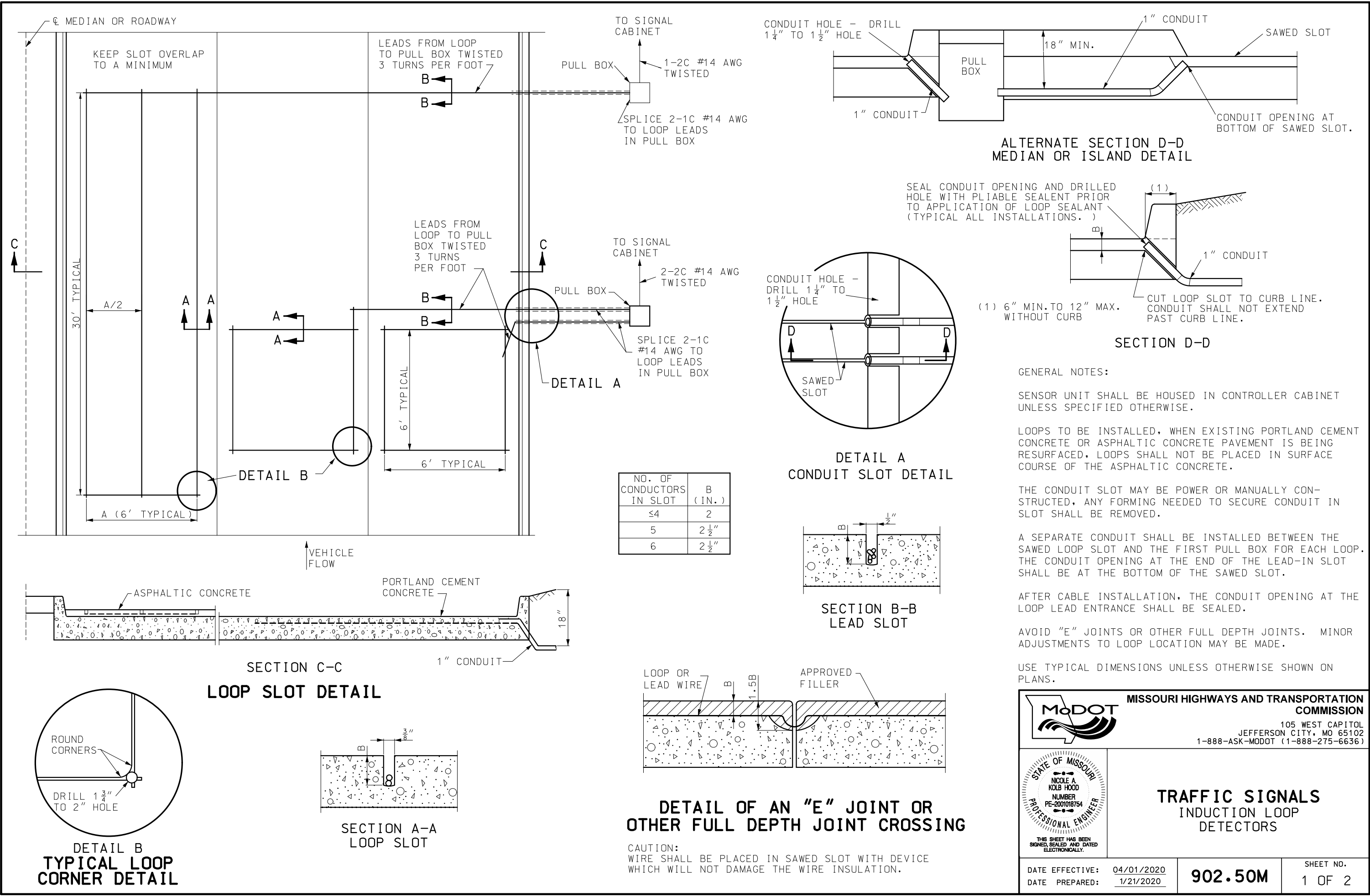
TRAFFIC SIGNALS
TUBULAR STEEL POSTS
DESIGN LOADING REQUIREMENTS

DATE EFFECTIVE: 04/01/2018
DATE PREPARED: 2/9/2018

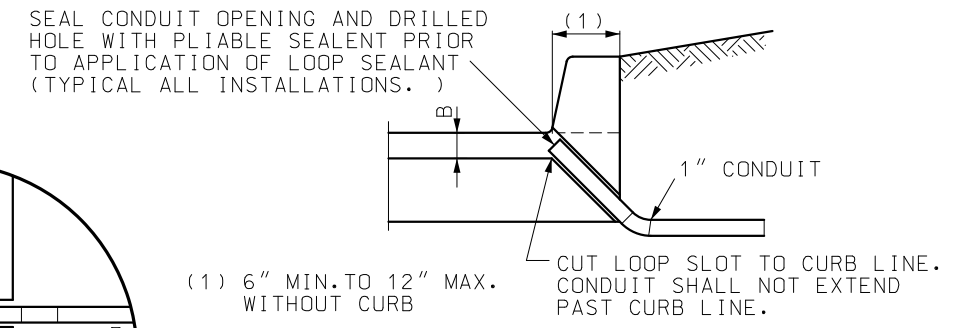
902.40R

SHEET NO.
3 OF 3

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



ALTERNATE SECTION D-D
MEDIAN OR ISLAND DETAIL



SECTION D-D

GENERAL NOTES:
SENSOR UNIT SHALL BE HOUSED IN CONTROLLER CABINET UNLESS SPECIFIED OTHERWISE.

LOOPS TO BE INSTALLED, WHEN EXISTING PORTLAND CEMENT CONCRETE OR ASPHALTIC CONCRETE PAVEMENT IS BEING RESURFACED, LOOPS SHALL NOT BE PLACED IN SURFACE COURSE OF THE ASPHALTIC CONCRETE.

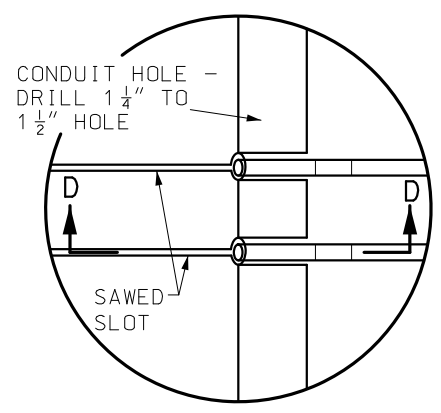
THE CONDUIT SLOT MAY BE POWER OR MANUALLY CON-STRUCTED, ANY FORMING NEEDED TO SECURE CONDUIT IN SLOT SHALL BE REMOVED.

A SEPARATE CONDUIT SHALL BE INSTALLED BETWEEN THE SAWED LOOP SLOT AND THE FIRST PULL BOX FOR EACH LOOP. THE CONDUIT OPENING AT THE END OF THE LEAD-IN SLOT SHALL BE AT THE BOTTOM OF THE SAWED SLOT.

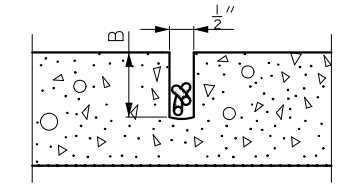
AFTER CABLE INSTALLATION, THE CONDUIT OPENING AT THE LOOP LEAD ENTRANCE SHALL BE SEALED.

AVOID "E" JOINTS OR OTHER FULL DEPTH JOINTS. MINOR ADJUSTMENTS TO LOOP LOCATION MAY BE MADE.

USE TYPICAL DIMENSIONS UNLESS OTHERWISE SHOWN ON PLANS.

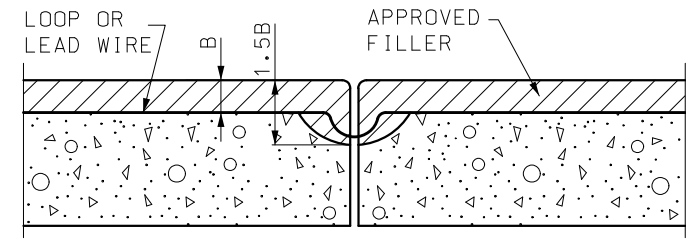


DETAIL A
CONDUIT SLOT DETAIL



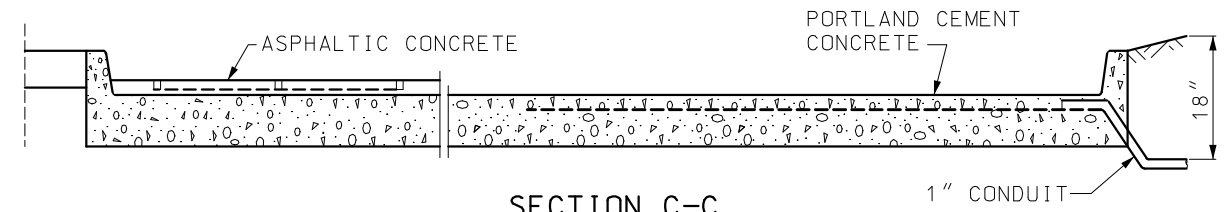
SECTION B-B
LEAD SLOT

| NO. OF CONDUCTORS IN SLOT | B (IN.) |
|---------------------------|---------|
| ≤4 | 2 |
| 5 | 2 1/2 |
| 6 | 2 1/2 |

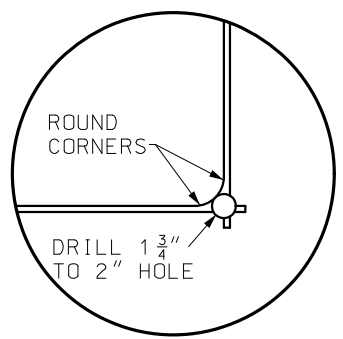


DETAIL OF AN "E" JOINT OR
OTHER FULL DEPTH JOINT CROSSING

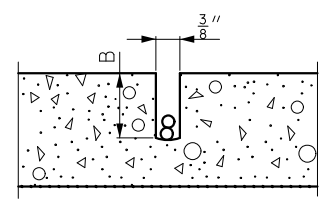
CAUTION:
WIRE SHALL BE PLACED IN SAWED SLOT WITH DEVICE WHICH WILL NOT DAMAGE THE WIRE INSULATION.




SECTION C-C
LOOP SLOT DETAIL



DETAIL B
TYPICAL LOOP
CORNER DETAIL

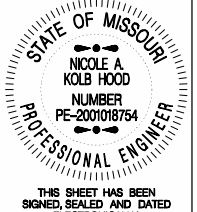


SECTION A-A
LOOP SLOT



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

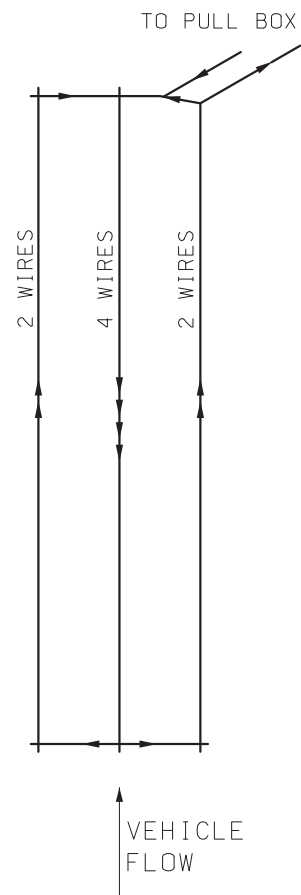


**TRAFFIC SIGNALS
INDUCTION LOOP
DETECTORS**

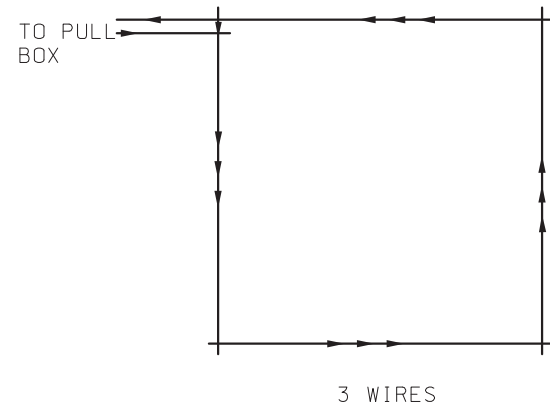
DATE EFFECTIVE: 04/01/2020
DATE PREPARED: 1/21/2020

902.50M

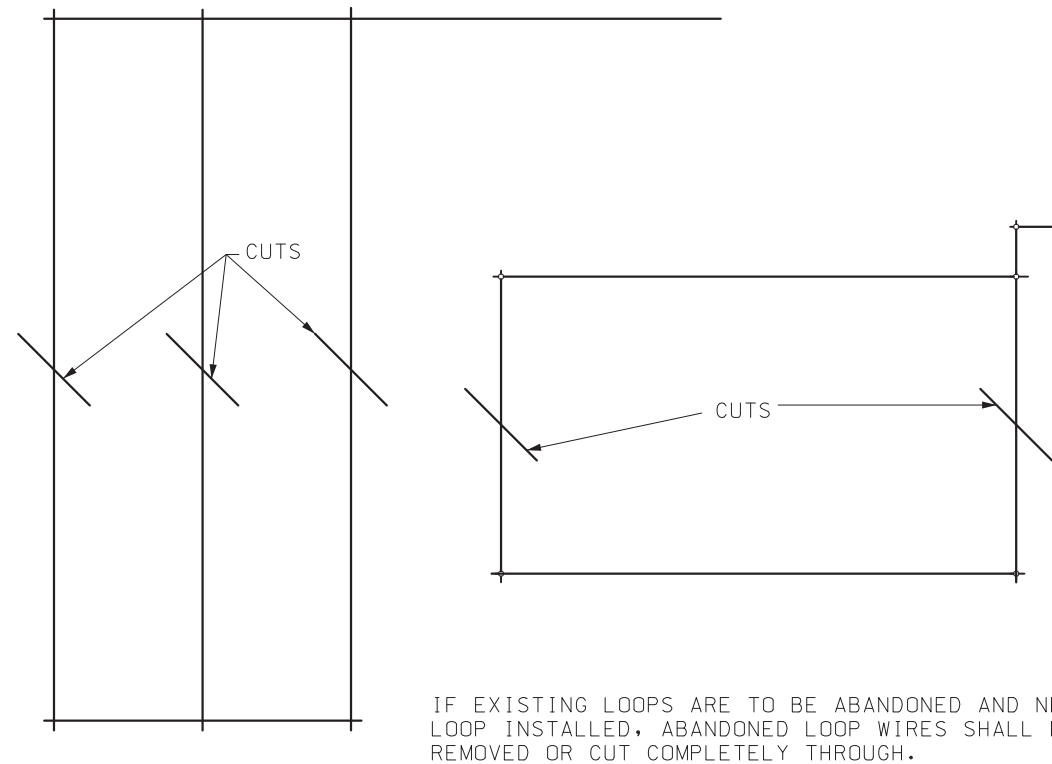
SHEET NO.
1 OF 2





LOOP SHALL BE #14 AWG STRANDED WIRE IN PVC DUCT MADE UP OF 2 NON-TWISTED TURNS IN SINGLE SLOT OR AS RECOMMENDED BY MANUFACTURER OF THE DETECTOR AMPLIFIER. LOOP SHALL BE PLACED IN SAWED SLOTS IN A FIGURE EIGHT MANNER.

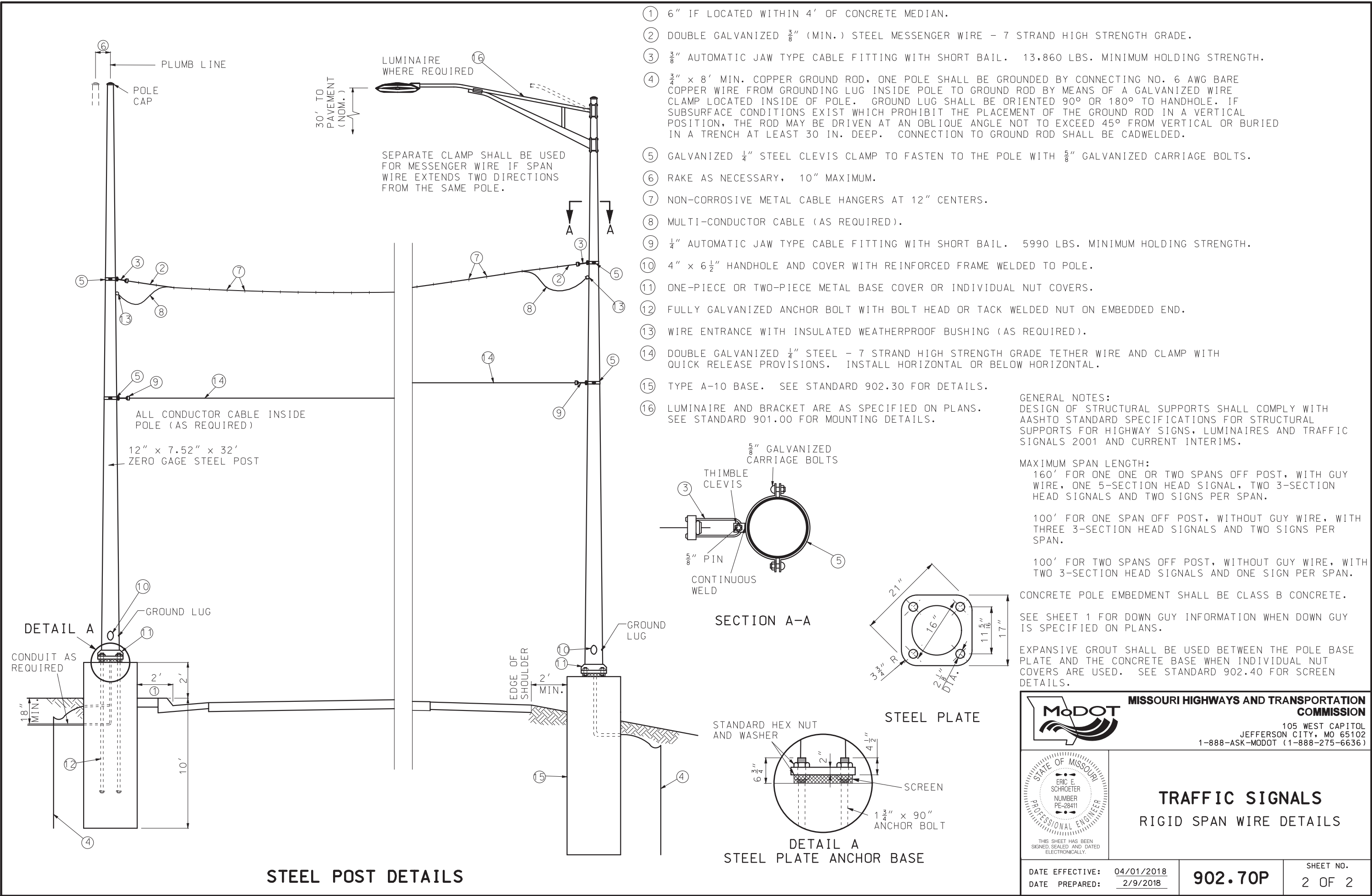


LOOP CONFIGURATION

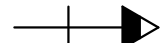
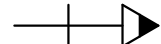
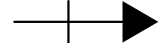
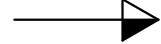

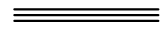
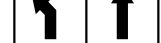






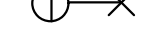
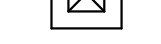
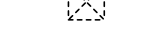








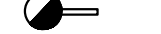



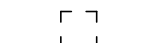







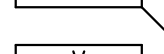
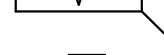


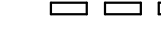

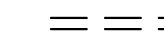
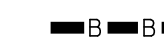


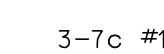
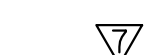
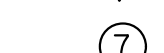

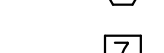
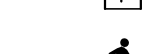

ABANDONED LOOPS

| | | | |
|---|--|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | | TRAFFIC SIGNALS INDUCTION LOOP DETECTORS | |
| DATE EFFECTIVE: 01/01/2020 DATE PREPARED: 10/17/2019 | | 902.50M | SHEET NO. 2 OF 2 |



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.


| | |
|---|--|
|  | OPTICALLY LIMITING SIGNAL HEAD WITH BACKPLATE |
|  | OPTICALLY LIMITING & CONVENTIONAL SIGNAL HEAD WITH BACKPLATE |
|  | CONVENTIONAL SIGNAL HEAD WITH BACKPLATE |
|  | SIGNAL HEAD - PEDESTRIAN |
|  | POST MOUNTED SIGNAL HEAD WITH SIGN AND BACKPLATE |
|  | STOP LINE |
|  | LANE USE |
|  | TYPE A BASE |
|  | TYPE F BASE |
|  | TYPE C BASE |
|  | EXISTING POST BASE |
|  | WOOD POLE WITH DOWN GUY |
|  | STEEL POLE |
|  | STEEL POLE WITH DOWN GUY |
|  | CONTROLLER WITH PAD |
|  | EXISTING CONTROLLER |
|  | PULL BOX, TYPE I DRAIN, CONCRETE |
|  | PULL BOX, TYPE II DRAIN, CONCRETE |
|  | PULL BOX, TYPE I DRAIN, PREFORMED |
|  | PULL BOX, TYPE II DRAIN, PREFORMED |
|  | DOUBLE PULL BOX, TYPE A, TYPE I DRAIN, CONCRETE |
|  | DOUBLE PULL BOX, TYPE A, TYPE II DRAIN, CONCRETE |
|  | DOUBLE PULL BOX, TYPE B, TYPE I DRAIN |
|  | DOUBLE PULL BOX, TYPE B, TYPE II DRAIN |
|  | PULL BOX, CLASS 5, TYPE I DRAIN, PREFORMED |
|  | PULL BOX, CLASS 5, TYPE II DRAIN, PREFORMED |


| | |
|---|--|
|  | EXISTING PULL BOX |
|  | SERVICE POLE OR PEDESTAL AND POWER SUPPLY |
|  | EXISTING SERVICE POLE |
|  | LED - A LUMINAIRE |
|  | SPAN WIRE WITH SIGNAL HEAD |
|  | MAST ARM WITH SIGNAL HEADS AND LED - A LUMINAIRE |
|  | MAST ARM WITH OVERHEAD SIGN |
|  | INDUCTION LOOP DETECTOR |
|  | VIDEO DETECTION ZONE |
|  | PUSH BUTTON DETECTOR |
|  | CAPPED RIGID CONDUIT |
|  | RIGID CONDUIT IN TRENCH |
|  | RIGID CONDUIT PUSHED |
|  | EXISTING RIGID CONDUIT |
|  | RIGID CONDUIT ON BRIDGE |
|  | RIGID CONDUIT IN MEDIAN |
|  | SIZE OF CONDUIT |
|  | NUMBER & AWG SIZE OF CABLE |
|  | SIGNAL FACE NUMBER |
|  | POST NUMBER |
|  | DETECTOR NUMBER |
|  | PULL BOX NUMBER |
|  | WALK INTERVAL |
|  | DON'T WALK INTERVAL |
|  | FLASHING DON'T WALK INTERVAL |

| | |
|-----|-----------------------------|
| R | RED (CIRCULAR) |
| FR | FLASHING RED (CIRCULAR) |
| RL | RED LEFT ARROW |
| Y | YELLOW (CIRCULAR) |
| FY | FLASHING YELLOW (CIRCULAR) |
| FYA | FLASHING YELLOW ARROW |
| FYL | FLASHING YELLOW LEFT ARROW |
| FYR | FLASHING YELLOW RIGHT ARROW |
| YL | YELLOW LEFT ARROW |
| YR+ | YELLOW RIGHT ARROW |
| G | GREEN (CIRCULAR) |
| S | GREEN STRAIGHT ARROW |
| L | GREEN LEFT ARROW |
| R+ | GREEN RIGHT ARROW |
| RE | TUNNEL VISOR WITH LOUVER |

ALL 12 INCH
WITH TUNNEL
VISOR

| SIGN | LEGEND |
|-----------|---------------------------------------|
| R10 - 10L | LEFT TURN SIGNAL |
| R10 - 10R | RIGHT TURN SIGNAL |
| R3 - 5L | LEFT ARROW (SYMBOL) ONLY |
| R3 - 5R | RIGHT ARROW (SYMBOL) ONLY |
| R3 - 5A | STRAIGHT ARROW (SYMBOL) ONLY |
| R3 - 6L | LEFT ARROW - STRAIGHT ARROW (SYMBOL) |
| R3 - 6R | RIGHT ARROW - STRAIGHT ARROW (SYMBOL) |
| R3 - 2 | NO LEFT TURN (SYMBOL) |
| R3 - 1 | NO RIGHT TURN (SYMBOL) |
| R3 - 3 | NO TURNS |
| D3 - 1 | STREET NAME (ONE LINE) |
| D3 - 1B | STREET NAME (TWO LINE) |
| R10 - 3E | CROSSWALK (PEDESTRIAN SYMBOL) |
| R10 - 11A | NO TURN ON RED |
| R10 - 13 | EMERGENCY SIGNAL |
| R10 - 27A | LEFT TURN YIELD ON FLASHING ARROW |


MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

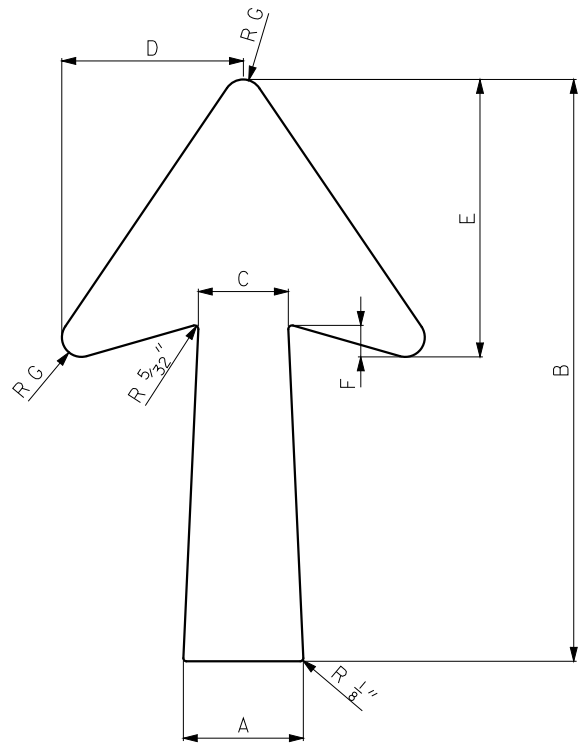


THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

TRAFFIC SIGNALS

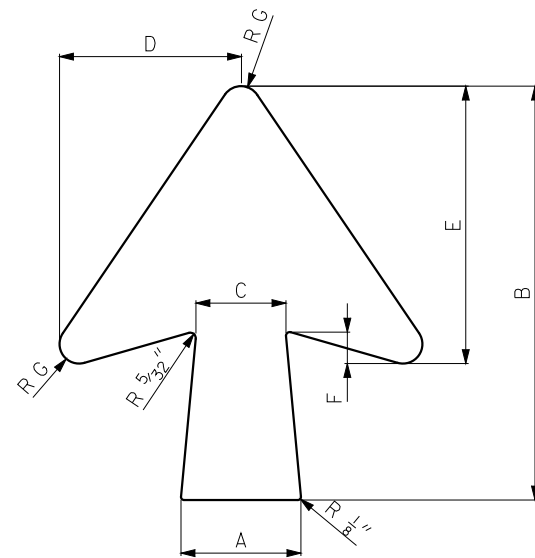
TRAFFIC SIGNAL SYMBOLS

| | | |
|----------------------------|---------|---------------------|
| DATE EFFECTIVE: 04/01/2020 | 902.80L | SHEET NO. 1 OF 1 |
| DATE PREPARED: 1/21/2020 | | |



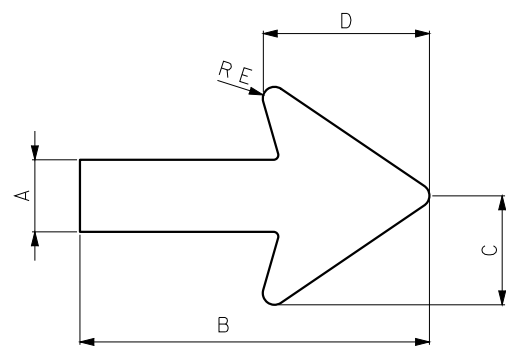
TYPE A

| TYPE A ARROW TABLE | | | | | | | |
|----------------------|--------|-----|--------|---------|----------|---------|---------|
| LETTER SIZE | A | B | C | D | E | F | RG |
| 8" U.C. | 5" | 25" | 3 3/4" | 7 9/16" | 11 9/16" | 1 5/16" | 1 3/16" |
| 10.67" & 13.33" U.C. | 6" | 30" | 4 1/2" | 9 1/8" | 14" | 1 1/2" | 3/4" |
| 16" U.C. | 7 1/8" | 35" | 5 3/8" | 11 1/8" | 17" | 1 3/4" | 1" |



TYPE B

| TYPE B ARROW TABLE | | | | | | | |
|--------------------|--------|-----|--------|---------|----------|---------|---------|
| LETTER SIZE | A | B | C | D | E | F | RG |
| 8" - 10.67" U.C. | 5" | 17" | 3 3/4" | 7 9/16" | 11 9/16" | 1 5/16" | 1 3/16" |
| 13.33" U.C. | 6" | 20" | 4 1/2" | 9 1/8" | 14" | 1 1/2" | 3/4" |
| 16" U.C. | 7 1/8" | 25" | 5 3/8" | 11 1/8" | 17" | 1 3/4" | 1" |

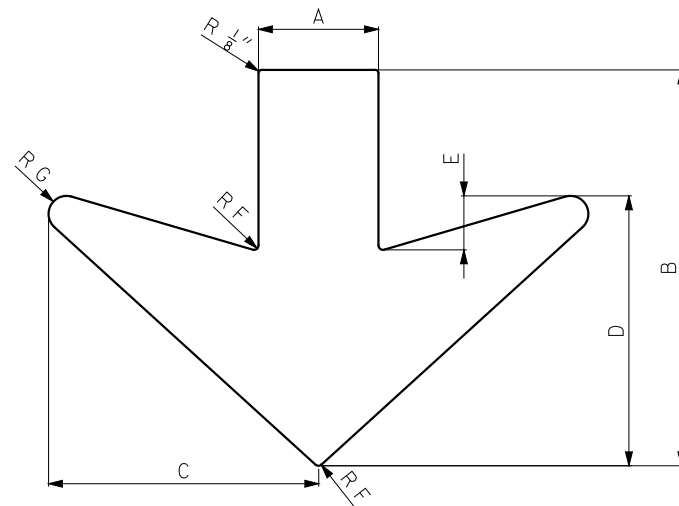


TYPE D

| TYPE D ARROW TABLE | | | | | |
|--------------------|--------|---------|---------|---------|--------|
| LETTER SIZE | A | B | C | D | RE |
| 6" U.C.** | 2 1/4" | 9" MIN. | 3" | 4 1/2" | 7/16" |
| 8" U.C. | 2 3/4" | 12 1/4" | 3 9/16" | 6 1/8" | 9/16" |
| 10.67" U.C. | 3 1/4" | 14 1/2" | 4 3/8" | 7 1/4" | 5/8" |
| 13.33" U.C. | 3 3/4" | 16 3/4" | 5 1/16" | 8 3/8" | 3/4" |
| 16" U.C. | 4 1/2" | 20" | 6 1/16" | 10" | 7/8" |
| 20" U.C. | 5 1/2" | 24 1/2" | 7 1/2" | 11 1/8" | 1 1/8" |

* FOR HORIZONTAL PLACEMENT UNDER LEGEND, DIMENSION "B" WILL BE EXTENDED, AT 1 FOOT INCREMENTS, TO APPROXIMATELY 50% OF THE MAXIMUM LEGEND WIDTH.

** FOR USE ON SIGNS WITH TYPE L-1 OR L-3 LEGENDS.



TYPE C

| TYPE C OVERHEAD ARROW DIMENSIONS | | | | | | |
|----------------------------------|-----|-----|-----|----|-------|----|
| A | B | C | D | E | RF | RG |
| 6 1/2" | 22" | 16" | 16" | 3" | 3/16" | 1" |

GENERAL NOTES:

ARROWS FOR REFERENCE ONLY.

ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

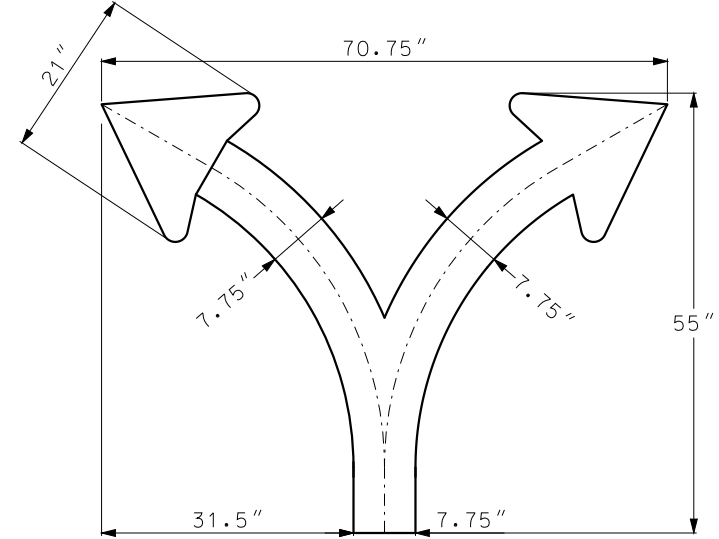
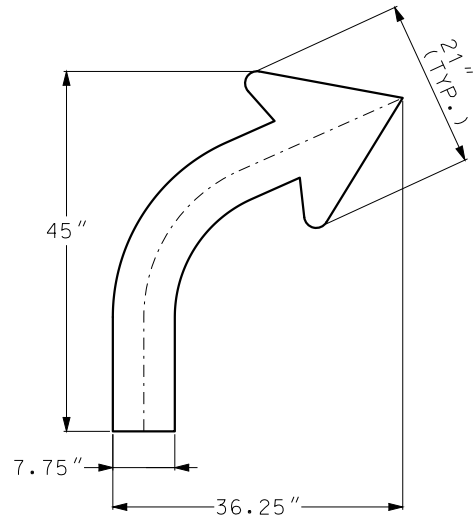
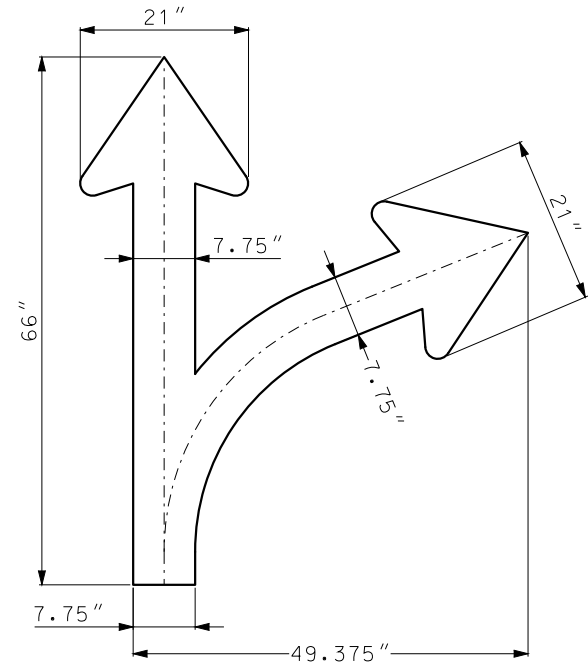
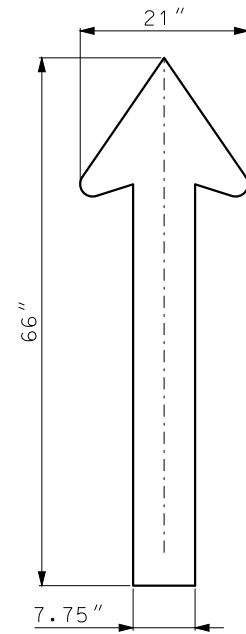
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STANDARD ARROW DETAILS

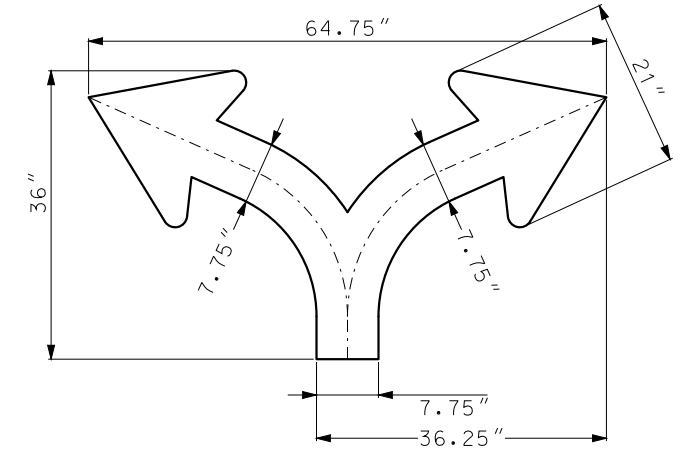
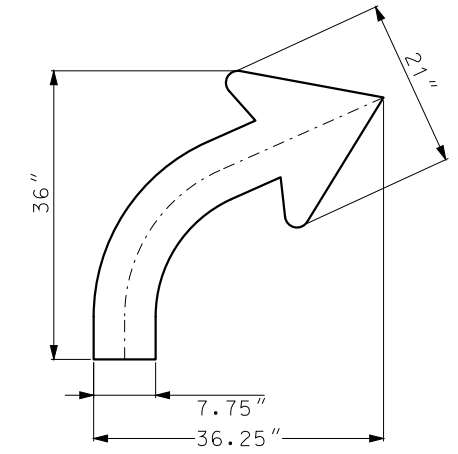
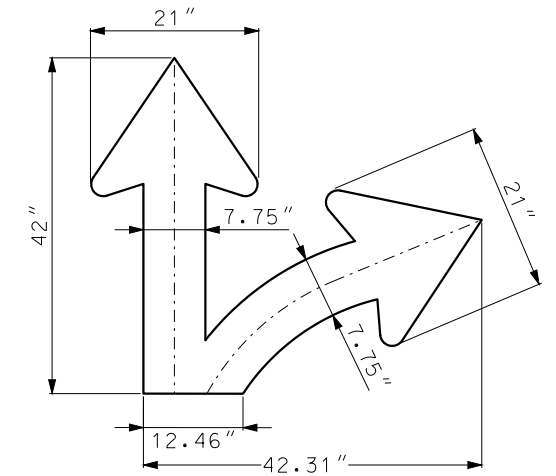
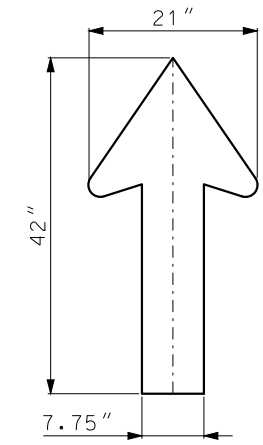
DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

903.01J

SHEET NO.
1 OF 2





MUTCD ARROWS



MODOT ARROWS

GENERAL NOTES:
ARROWS FOR REFERENCE ONLY.
ARROW DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY
SAFETY DIVISION.

| | |
|--|---------------------------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | STANDARD ARROW DETAILS |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016 | 903.01J SHEET NO. 2 OF 2 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

STRUCTURAL SIGN DATA

| DESIGNATION | COLOR SCHEME | | SHEETING | |
|------------------------------|--------------|-----------------|-------------------|-------------------|
| | LEGEND | BACKGROUND | LEGEND | BACKGROUND |
| STRUCTURAL (ST) | BLACK | WHITE | OPAQUE BLACK FILM | ASTM TYPE 4 |
| | WHITE | RED | ASTM TYPE 9 OR 11 | ASTM TYPE 4 |
| | WHITE | GREEN | ASTM TYPE 9 OR 11 | ASTM TYPE 4 |
| | WHITE | BLUE | ASTM TYPE 9 OR 11 | ASTM TYPE 4 |
| | WHITE | BROWN | ASTM TYPE 9 OR 11 | ASTM TYPE 4 |
| STRUCTURAL FLUORESCENT (STF) | BLACK | FL YELLOW | OPAQUE BLACK FILM | ASTM TYPE 9 OR 11 |
| | BLACK | FL YELLOW GREEN | OPAQUE BLACK FILM | ASTM TYPE 9 OR 11 |
| | BLACK | FL ORANGE | OPAQUE BLACK FILM | ASTM TYPE 9 OR 11 |

NOTE: WHITE LEGEND IS DIRECT APPLIED UNLESS SPECIFIED OTHERWISE.

FLAT SHEET SIGN DATA

| DESIGNATION | COLOR SCHEME | | SHEETING |
|------------------------------|--------------|-----------------|-----------------------------------|
| | LEGEND | BACKGROUND | |
| FLAT SHEET (SH) | BLACK ** | WHITE | ASTM TYPE 4 WHITE |
| | WHITE | BLACK ** | ASTM TYPE 4 WHITE |
| | RED | WHITE | ASTM TYPE 4 WHITE |
| | WHITE | RED | ASTM TYPE 4 WHITE |
| | WHITE | GREEN | ASTM TYPE 4 WHITE |
| | GREEN | WHITE | ASTM TYPE 4 WHITE |
| | WHITE | BLUE | ASTM TYPE 4 WHITE |
| | WHITE | BROWN | ASTM TYPE 4 WHITE |
| | BLACK ** | FL YELLOW | ASTM TYPE 9 OR 11 FL YELLOW |
| FLAT SHEET FLUORESCENT (SHF) | BLACK ** | FL YELLOW GREEN | ASTM TYPE 9 OR 11 FL YELLOW GREEN |
| | BLACK ** | FL ORANGE | ASTM TYPE 9 OR 11 FL ORANGE |

** OPAQUE INK OR FILM

NOTE: LEGEND AND BACKGROUND COLORS ARE ACHIEVED THROUGH TRANSLUCENT INKS AND FILMS.

FLAT SHEET THICKNESS

| SIGN SIZE | THICKNESS |
|--------------------|-----------|
| 9 SF OR LESS | 0.080 IN. |
| OVER 9 SF TO 16 SF | 0.100 IN. |
| 16 SF OR LARGER | 0.125 IN. |


GENERAL NOTES:

GROUND MOUNTED SIGNS GREATER THAN 5 FEET WIDE OR SIGNS GREATER THAN 30 SQUARE FEET SHALL BE STRUCTURAL.

ALL NON STANDARD SIGNS NOT FOUND IN THE MUTCD SHS MANUAL SHALL BE DETAILED BY THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.

REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING, SUBSTRATE AND FABRICATION DETAILS.

FOR MOUNTING DETAILS, SEE STANDARD PLANS 903.02.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

NICOLE A. KOLB HOOD

NUMBER

PE-2001018754

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED, AND DATED
ELECTRONICALLY.

HIGHWAY SIGNING

GENERAL SIGN DATA

DATE EFFECTIVE: 10/01/2019

DATE PREPARED: 7/18/2019

903.02AP

SHEET NO.

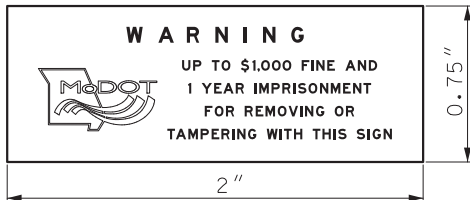
1 OF 8

IF A SEAL IS PRESENT ON THIS SHEET, IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

MODOT ID LABEL DETAILS
PLACED ON THE SIGN FACE



(1) USED ON SIGNS 9 SF AND LARGER

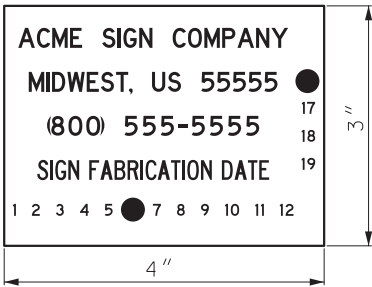


(1) USED ON SIGNS LESS THAN 9 SF

VENDOR ID LABEL DETAILS
PLACED ON THE BACK OF THE SIGN



OPTIONAL



(2)

OPTIONAL



(3)

- (1) MODOT ID LABEL DETAILS AVAILABLE FROM TRAFFIC AND HIGHWAY SAFETY DIVISION.
- (2) TO FACILITATE MASS PRODUCTION OF LABELS, THE FABRICATION DATE MAY BE INDICATED BY DISPLAYING NUMBERS FOR MONTHS ALONG THE BOTTOM OF THE LABEL AND NUMBERS FOR YEARS ALONG THE RIGHT SIDE OF THE LABEL. THE FABRICATION DATE WOULD BE INDICATED BY HOLE PUNCHING THE APPROPRIATE NUMBERS (OR SOME EQUIVALENT PERMANENT METHOD TO BLOCK OUT OF THE NUMBERS) FOR THE MONTH AND YEAR BEFORE THE LABEL IS APPLIED TO THE SIGN.
- (3) INDIVIDUAL DECALS MAY BE USED TO DISPLAY THE VENDOR INFORMATION AND THE FABRICATION DATE. DECALS SHALL BE INSTALLED IN CLOSE VERTICAL PROXIMITY.
- (4) THE MODOT ID LABEL MAY BE PLACED ON THE BACK OF THE SIGN ABOVE THE VENDOR ID LABEL IF THERE IS INSUFFICIENT SPACE AVAILABLE TO DISPLAY THE ID LABEL ON THE SIGN FACE WITHOUT INTERFERING WITH THE SIGN LEGEND OR BORDER.

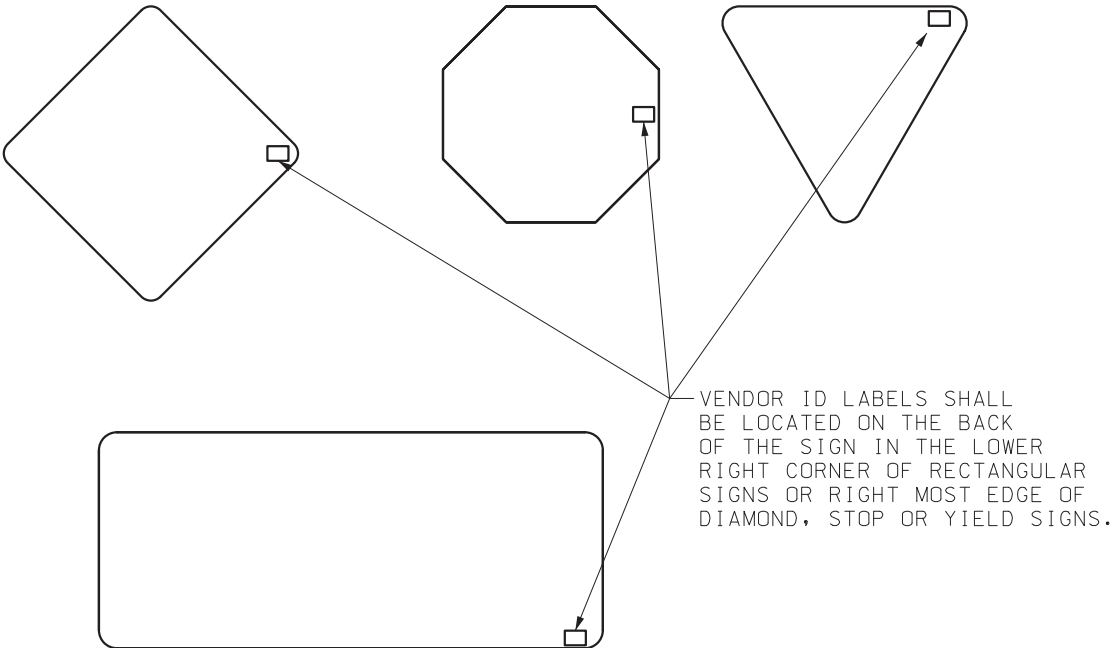
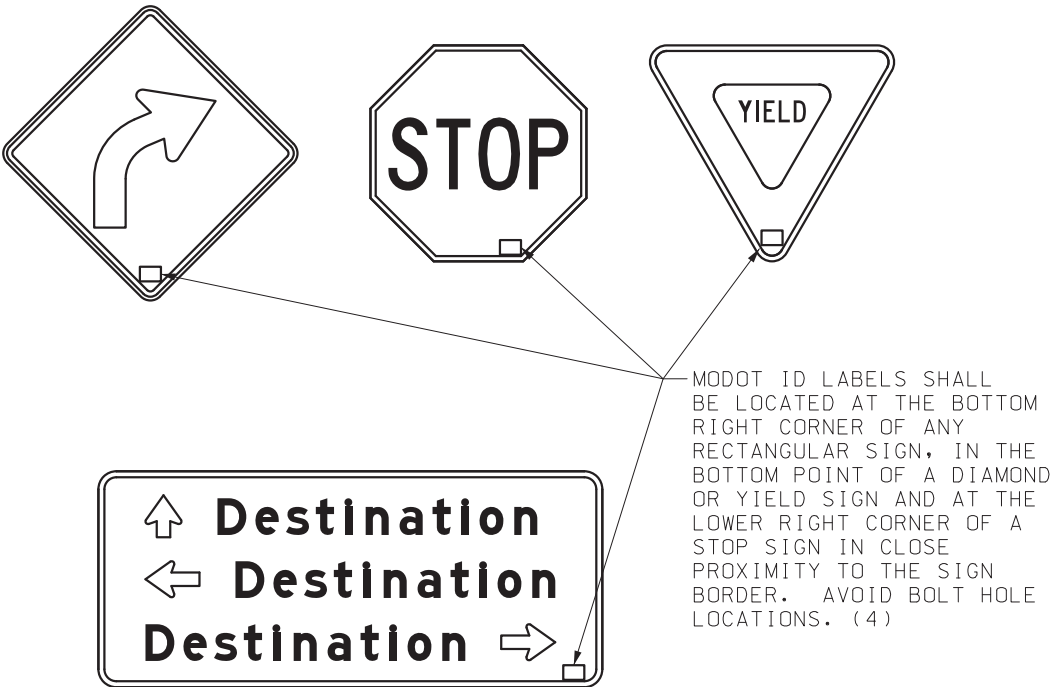
GENERAL NOTES:



ALL DECALS SHALL BE SILK SCREEN PRINTED WITH MATCHED COMPONENT INK AND SHEETING MATERIALS TO PROVIDE A LABEL THAT HAS AN EQUAL LIFE EXPECTANCY AS THE SIGN FACE.

MODOT ID LABELS SHALL BE PRINTED ON CLEAR ELECTRO CUT FILM BACKGROUND WITH BLACK INK OR IT MAY BE INCORPORATED INTO THE SILK SCREEN DETAIL AND PRINTED ALONG WITH THE SIGN FACE. IF THE LABEL IS APPLIED IN THIS MANNER THE LEGEND OF THE LABEL SHALL MATCH THE COLOR OF THE SIGN LEGEND IT IS BEING APPLIED TO. THE LABEL SHALL NOT HAVE ANY BACKGROUND COLOR OR BORDER.

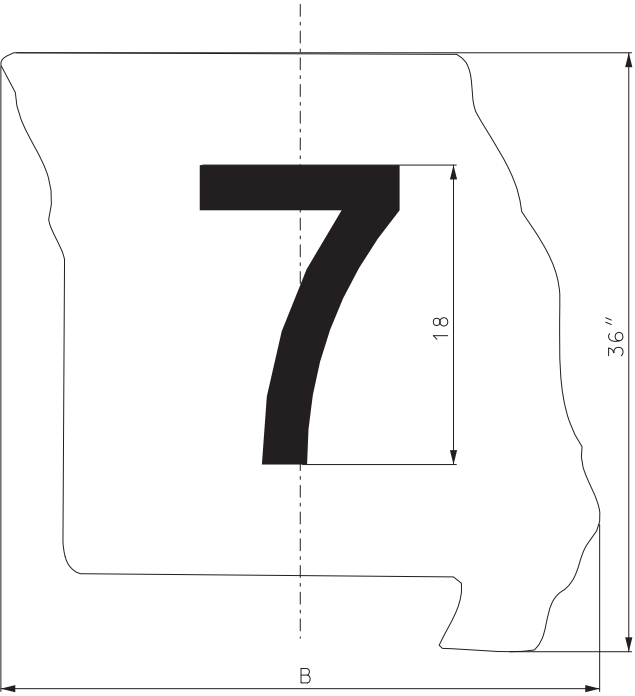
VENDOR ID LABEL SHALL CONTAIN THE COMPANY CONTACT INFORMATION (INCLUDING FULL NAME, CITY, STATE, PHONE NUMBER) AND THE SIGN FABRICATION DATE.

VENDOR ID LABEL SHALL BE PRINTED ON A WHITE BACKGROUND WITH BLACK INK AND THE LEGEND SHALL BE A MINIMUM OF 1/4".

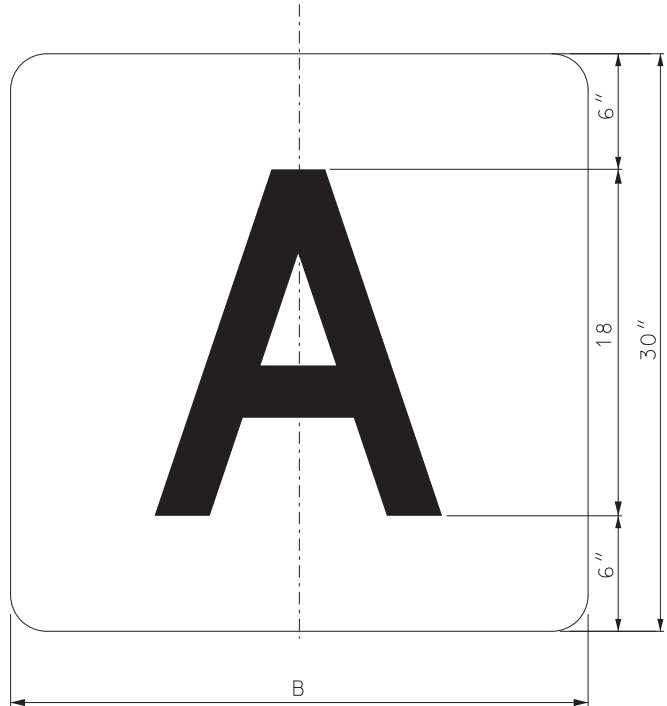


| | | |
|--|---|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  <small>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</small> | HIGHWAY SIGNING GENERAL SIGN DATA | |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 903.02AP | SHEET NO. 2 OF 8 |

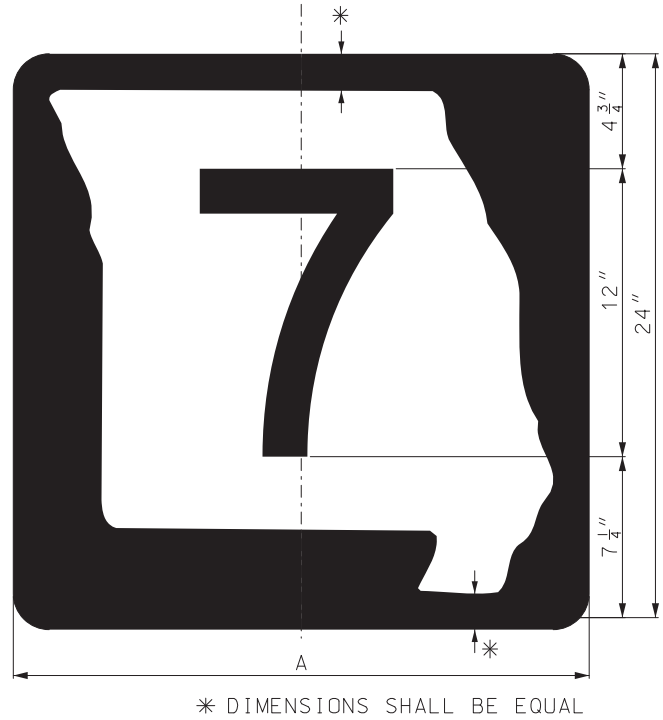
STATE NUMBER ROUTE SHIELD
GUIDE SIGN USE



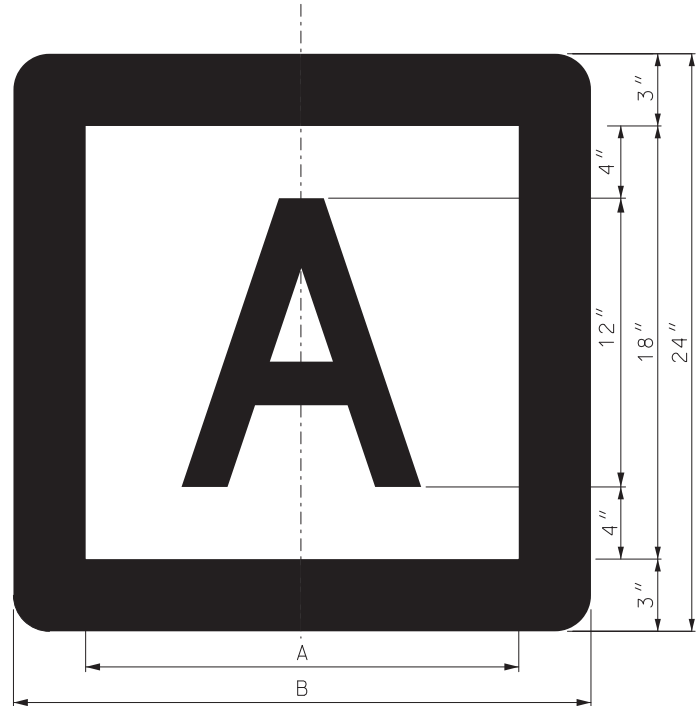
STATE LETTER ROUTE SHIELD
GUIDE SIGN USE



STATE NUMBER ROUTE SHIELD
INDEPENDENT USE



STATE LETTER ROUTE SHIELD
INDEPENDENT USE



| LOCATION | NO. OF LETTERS | DIMENSIONS (INCHES) | | LEGEND FONTS |
|-----------------|----------------|---------------------|----|--------------|
| | | A | B | |
| INDEPENDENT USE | 1 | 18 | 24 | D |
| INDEPENDENT USE | 2 | 24 | 30 | D |
| GUIDE SIGN USE | 1 | – | 30 | D |
| GUIDE SIGN USE | 2 | – | 36 | D |

STATE LETTER ROUTE SHIELD



| LOCATION | ROUTE NUMBER | DIMENSIONS (INCHES) | | LEGEND FONTS |
|-----------------|--------------|---------------------|----|--------------|
| | | A | B | |
| INDEPENDENT USE | 1 & 2 DIGITS | 24 | 24 | D,C |
| INDEPENDENT USE | 3 DIGITS | 30 | 30 | D,C,B |
| GUIDE SIGN USE | 1 & 2 DIGITS | – | 36 | D,C |
| GUIDE SIGN USE | 3 DIGITS | – | 45 | D,C,B |

STATE NUMBER ROUTE SHIELD

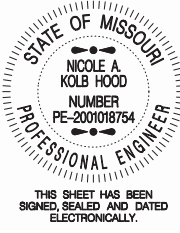


GENERAL NOTES:

- REFER TO STANDARD SPECIFICATION SEC 1042 FOR SHEETING AND SUBSTRATE DETAILS.
- FOR HOLE PUNCHING AND MOUNTING DETAILS SEE OTHER DRAWINGS.
- FOR GENERAL SIGN DATA DETAILS SEE OTHER DRAWINGS.
- THE MISSOURI SHAPE DETAIL MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.
- GUIDE SIGN USE SHALL BE DIRECT APPLIED. POST MOUNTED USE SHALL BE APPLIED TO ALUMINUM SUBSTRATE.
- FOR NUMBERED ROUTES WITH MORE THAN 1 DIGIT THE LEGEND FONT MAY NEED TO BE REDUCED TO C OR B FONT.
- SEE MUTCD SHS FOR DETAILS FOR US AND INTERSTATE ROUTE SHIELDS.
- NON-STANDARD SHIELD SIZES MAY BE OBTAINED FROM THE TRAFFIC AND HIGHWAY SAFETY DIVISION OFFICE.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

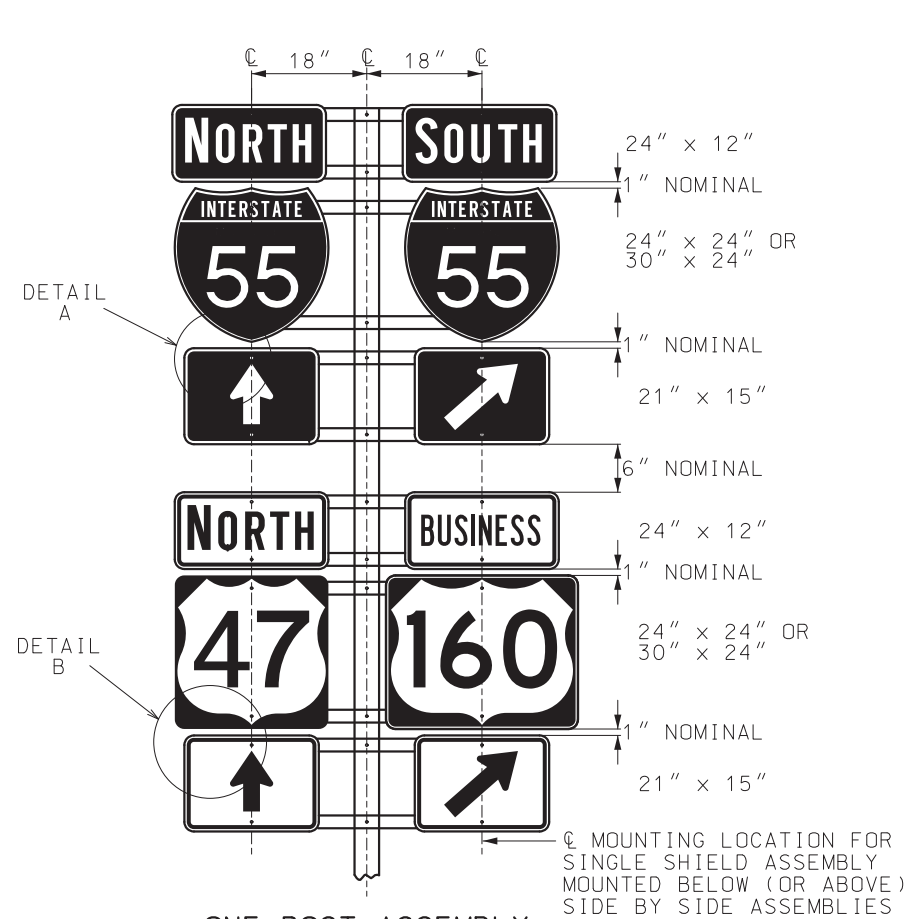


HIGHWAY SIGNING
STANDARD SHIELDS FOR
INDEPENDENT AND GUIDE
SIGN USE

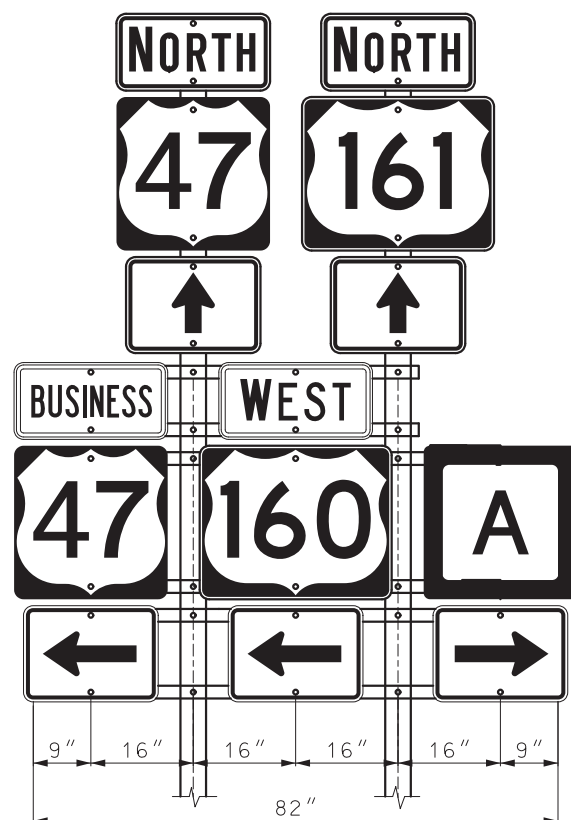
DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.02AP

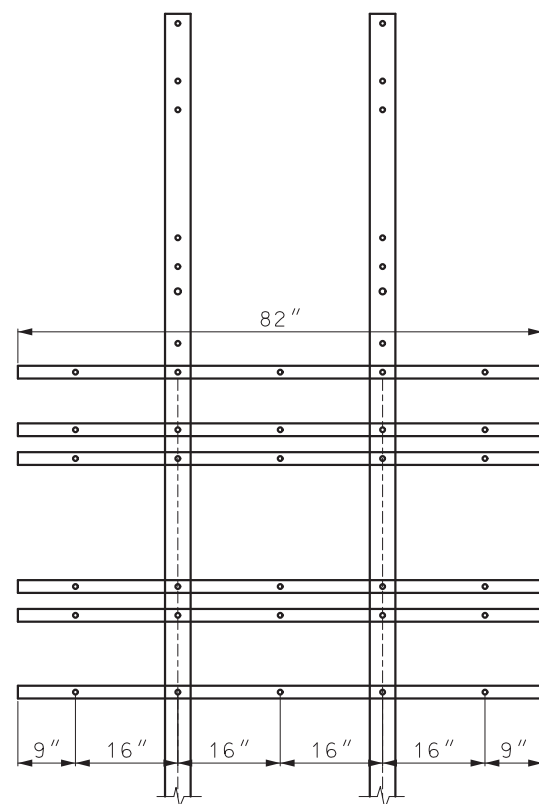
SHEET NO.
3 OF 8



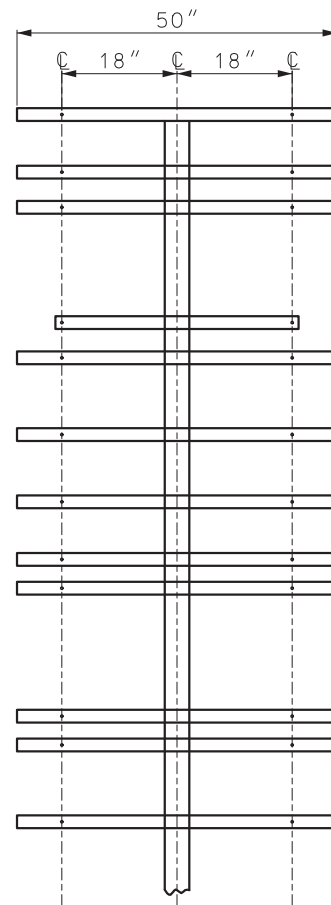
ONE POST ASSEMBLY
USE TO SUPPORT UP TO 4 ROUTE MARKERS



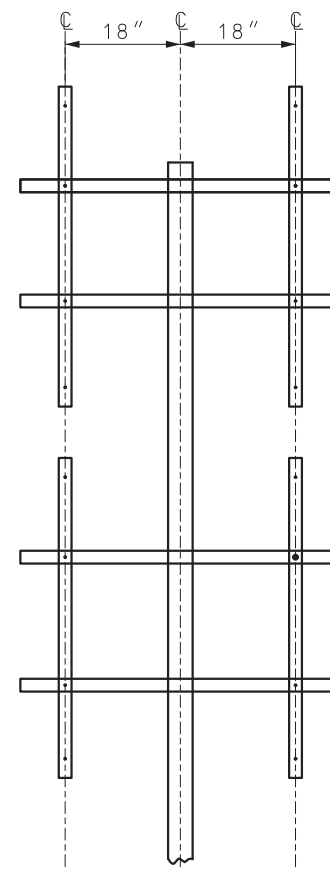
TWO POST ASSEMBLY
USE TO SUPPORT 5 OR 6 ROUTE MARKERS



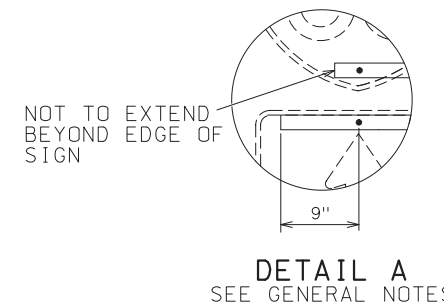
STANDARD BACKING
BAR LAYOUT



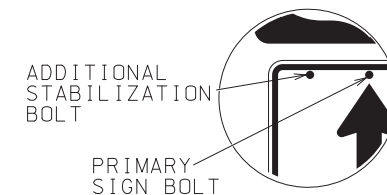
STANDARD BACKING
BAR LAYOUT



OPTIONAL BACKING
BAR LAYOUT



DETAIL A
SEE GENERAL NOTES



DETAIL B
SEE GENERAL NOTES

GENERAL NOTES:

ALL BACKING BARS SHALL BE 2"x 3/8" STEEL, GALVANIZED AFTER PUNCHING. WEIGHT = 2.55 LBS. PER FOOT. HOLES IN BARS SHALL BE 3/8" AND SHALL BE PUNCHED AS SHOWN ON THIS DRAWING.

DETAIL A - THE END OF THE HORIZONTAL BACKING BARS SHALL EXTEND MAXIMUM OF 9 INCHES PAST THE SIGN BOLT, BUT SHALL NOT EXTEND PAST THE EDGE OF THE SIGN.

DETAIL B - FOR SIGNS INSTALLED ON TWO PARALLEL HORIZONTAL BACKING BARS, ONE ADDITIONAL BOLT SHALL BE ADDED TO THE LEFT SIGN TO KEEP ASSEMBLY SQUARE.

WHEN USING OPTIONAL BACKING BAR LAYOUT, VERTICAL BARS SHALL BE MOUNTED BEHIND HORIZONTAL BARS.


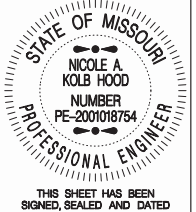
BACKING BARS SHALL MEET MISSOURI STANDARD PLANS OR APPROVED PRODUCTS LIST.

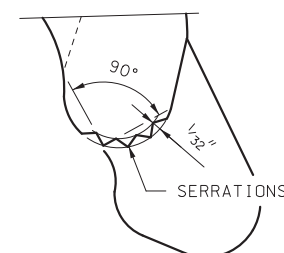
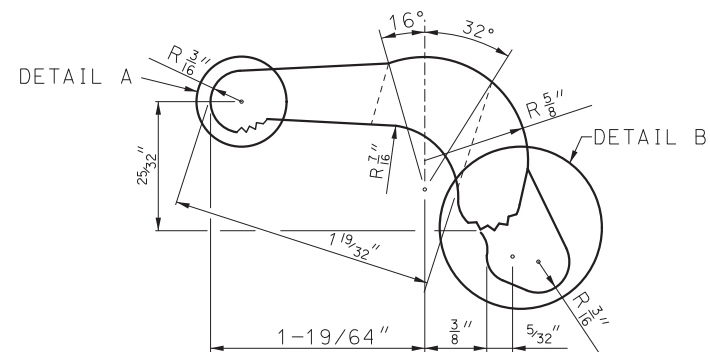
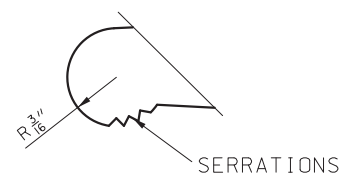
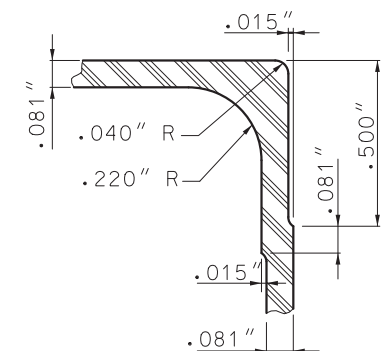
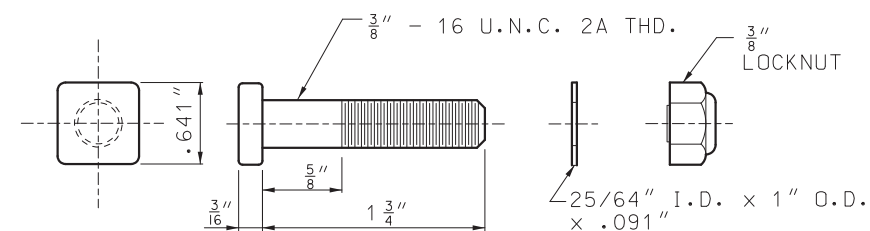
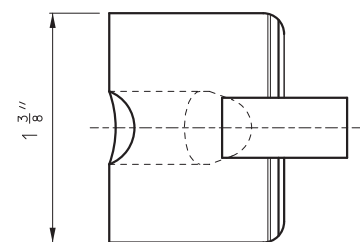
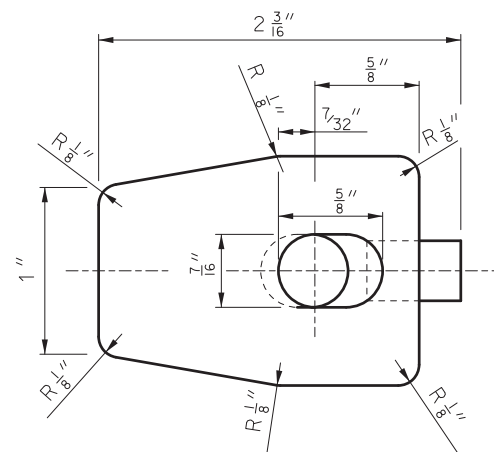
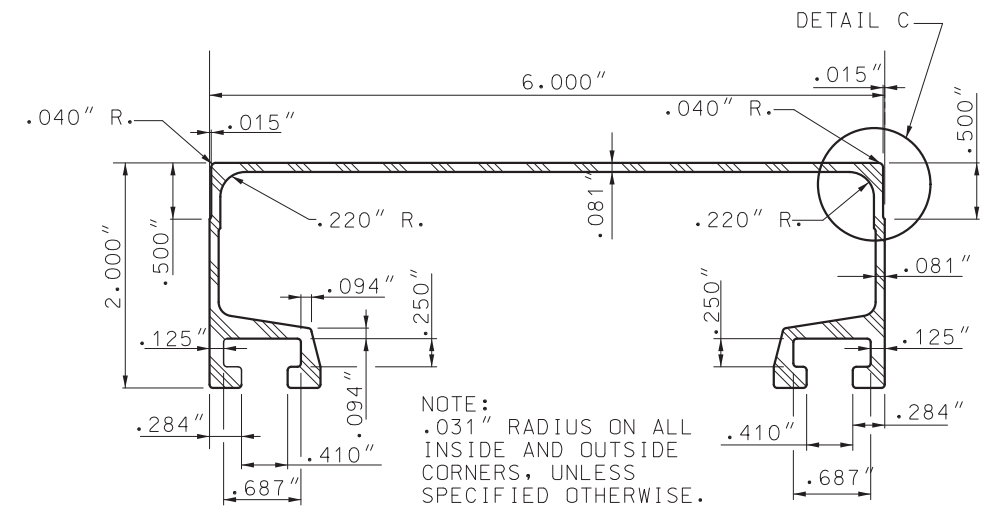
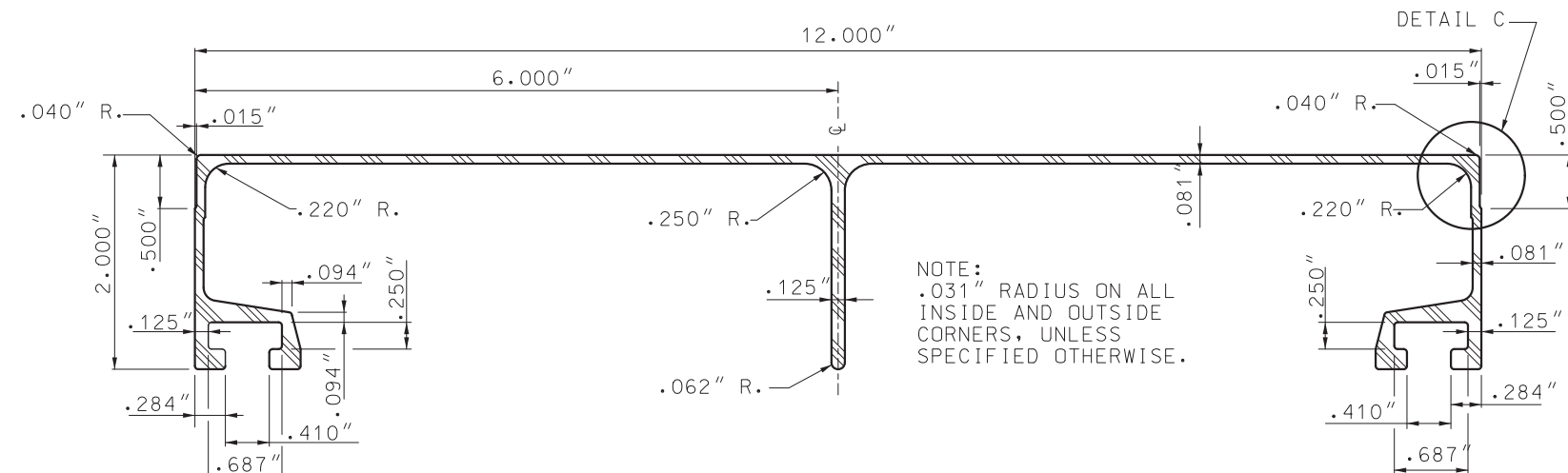
BACKING BARS PAID FOR AS STRUCTURAL STEEL, PER POUND.

ALL SIGNS TO BE INSTALLED ALONG VERTICAL CENTERLINES.



FOR POST AND FOOTING DATA AND DETAILS OF SHIELDS AND PLAQUES, SEE OTHER DRAWINGS.

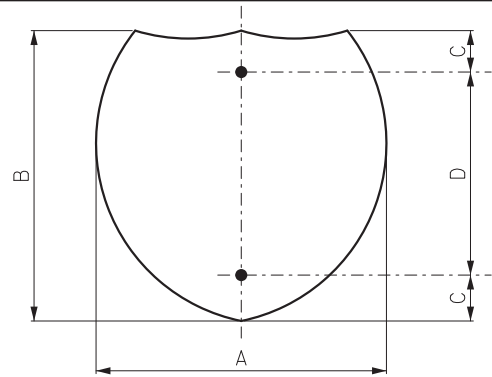
NOMINAL VERTICAL SPACING INDICATED BETWEEN SIGNS TO BE ACHIEVED BY USING THE CLOSEST AVAILABLE HOLES WHEN USING PSST.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | HIGHWAY SIGNING BACKING BARS SHEET SIGN MOUNTING ROUTE SHIELD AND MARKER ASSEMBLIES |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 903.02AP |
| SHEET NO. 4 OF 8 | |

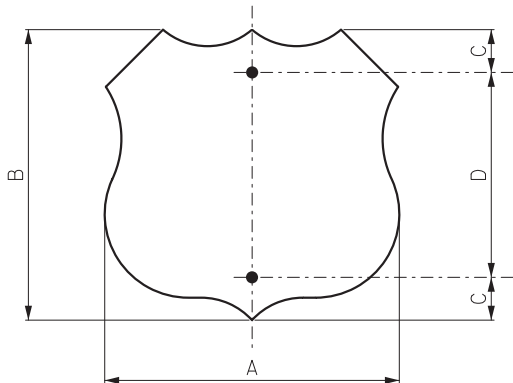


SAW GATING AS SHOWN
(APPROXIMATELY FLAT PERMISSABLE)

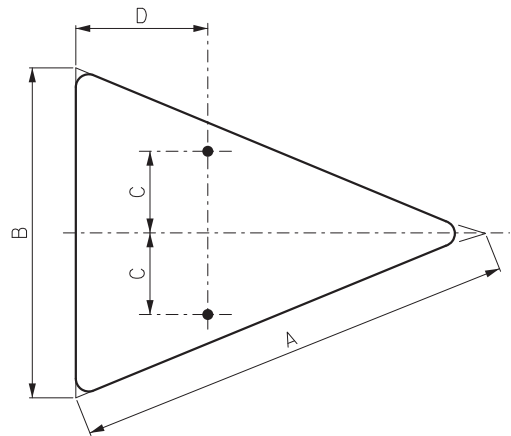
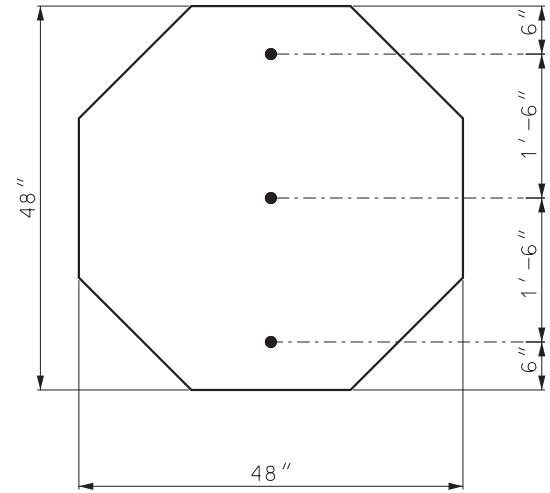
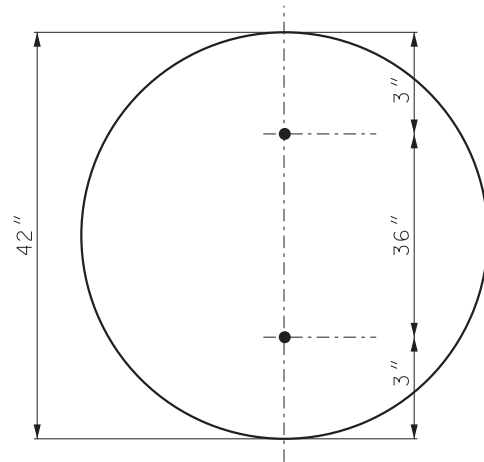
| | | | |
|---|-------------------|--|---------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2007018754 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | | HIGHWAY SIGNING EXTRUDED ALUMINUM PANEL DETAILS | |
| DATE EFFECTIVE: | <u>10/01/2019</u> | 903.02AP | SHEET NO. |
| DATE PREPARED: | <u>7/18/2019</u> | | 5 OF 8 |



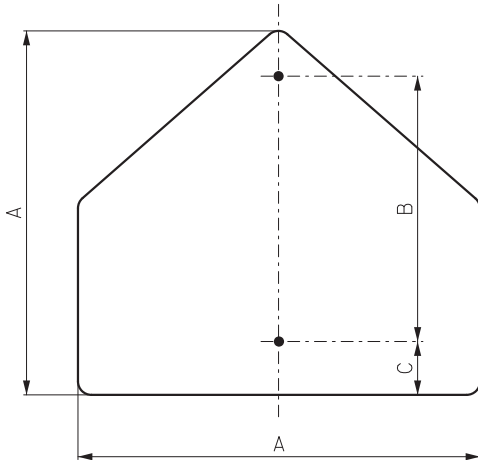
| DIMENSIONS (IN.) | | | |
|------------------|----|---|----|
| A | B | C | D |
| 24 | 24 | 3 | 18 |
| 30 | 24 | 3 | 18 |
| 36 | 36 | 6 | 24 |
| 45 | 36 | 6 | 24 |



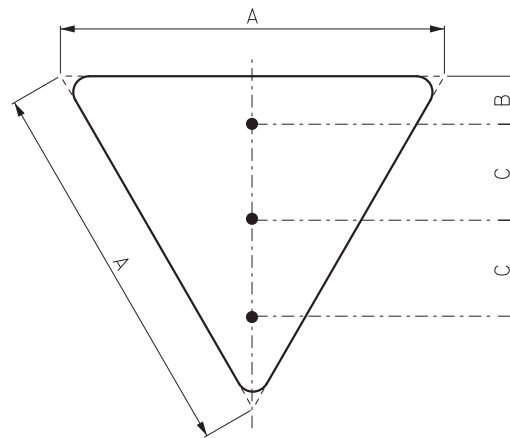
| DIMENSIONS (IN.) | | | |
|------------------|----|---|----|
| A | B | C | D |
| 24 | 24 | 3 | 18 |
| 30 | 24 | 3 | 18 |
| 36 | 36 | 6 | 24 |
| 45 | 36 | 6 | 24 |



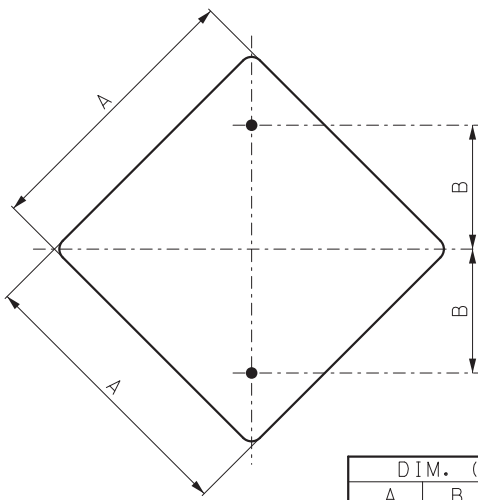
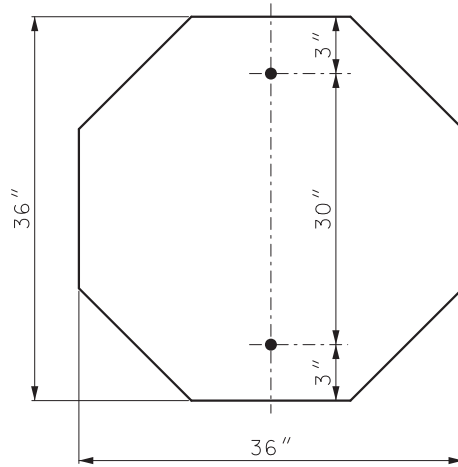
| DIMENSIONS (IN.) | | | | |
|------------------|----|-----|----|--------|
| A | B | C | D | RADIUS |
| 40 | 30 | 7.5 | 12 | 1.875 |
| 48 | 36 | 9 | 15 | 2.25 |



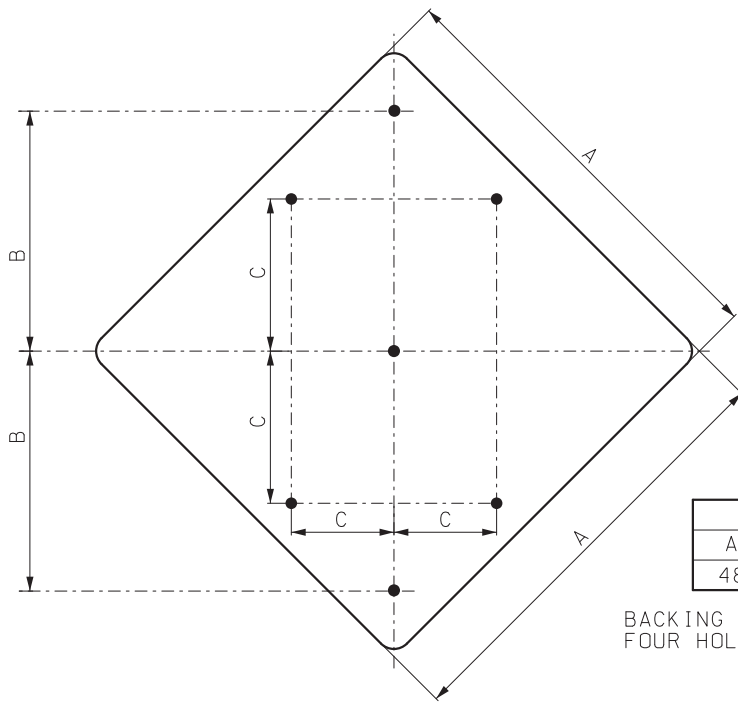
| DIMENSIONS (IN.) | | | |
|------------------|----|---|--------|
| A | B | C | RADIUS |
| 36 | 24 | 3 | 2.25 |



| DIMENSIONS (IN.) | | | |
|------------------|---|----|--------|
| A | B | C | RADIUS |
| 48 | 6 | 12 | 3 |
| 60 | 8 | 15 | 4 |



| DIM. (IN.) | | |
|------------|----|--------|
| A | B | RADIUS |
| 18 | 9 | 1.5 |
| 24 | 12 | 1.5 |
| 30 | 15 | 1.875 |
| 36 | 18 | 2.25 |



| DIMENSIONS (IN.) | | | |
|------------------|----|----|--------|
| A | B | C | RADIUS |
| 48 | 24 | 15 | 3 |

BACKING BARS ONLY REQUIRED FOR FOUR HOLE PUNCH INSTALLATION.

GENERAL NOTES:

SIGNS WITH FOUR OR MORE HOLES REQUIRE BACKING BARS OR MULTIPLE POSTS.

HOLES IN SIGNS SHALL BE $\frac{3}{8}$ " AND PUNCHED AS SHOWN ON THIS DRAWING.

FLAT SHEET FOR SIGNS SHALL BE THE FOLLOWING THICKNESS:

- 9 SQUARE FEET OR LESS - .080 IN.,
- OVER 9 SQUARE FEET BUT LESS THAN 16 SQUARE FEET - .100 IN.,
- 16 SQUARE FEET OR LARGER - .125 IN.

FOR MOUNTING DETAILS, SEE OTHER DRAWINGS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

NICOLE A. KOLB HOOD
NUMBER
PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

HIGHWAY SIGNING

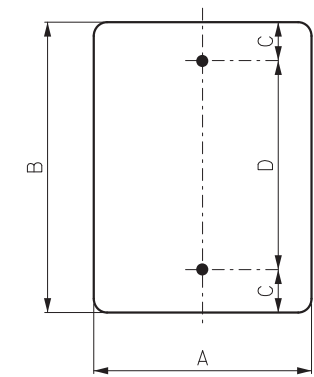
HOLE PUNCHING

DATE EFFECTIVE: 10/01/2019

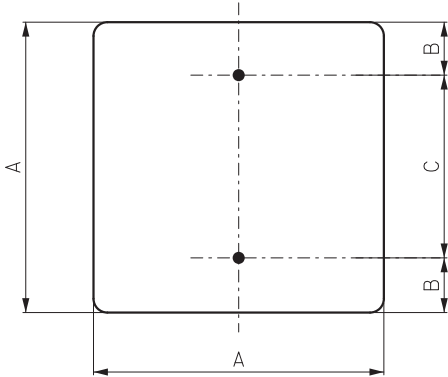
DATE PREPARED: 7/18/2019

903.02AP

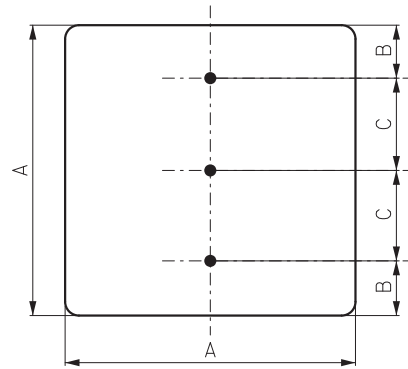
SHEET NO.
6 OF 8



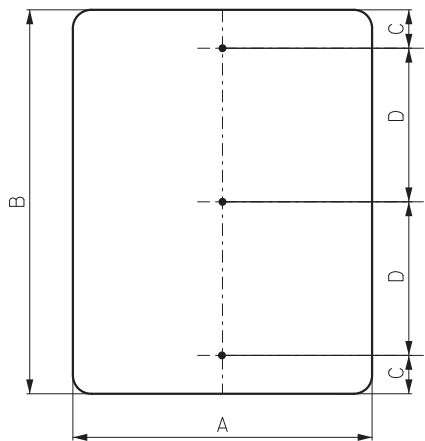
| DIMENSIONS (IN.) | | | | |
|------------------|----|------|------|--------|
| A | B | C | D | RADIUS |
| 4 | 16 | 0.75 | 14.5 | SQ |
| 6 | 12 | 1.5 | 9 | 1 |
| 9 | 12 | 3.5 | 5 | 1.5 |
| 9 | 15 | 3.75 | 7.5 | 1.5 |
| 12 | 18 | 3 | 12 | 1.5 |
| 12 | 24 | 3 | 18 | 1.5 |
| 12 | 36 | 3 | 30 | 1.5 |
| 12 | 48 | 3 | 42 | 1.5 |
| 15 | 21 | 3 | 15 | 1.5 |
| 18 | 24 | 3 | 18 | 1.5 |
| 24 | 30 | 3 | 24 | 1.5 |
| 24 | 36 | 3 | 30 | 1.5 |
| 30 | 36 | 3 | 30 | 1.875 |
| 30 | 42 | 3 | 36 | 1.875 |
| 30 | 48 | 6 | 36 | 1.875 |



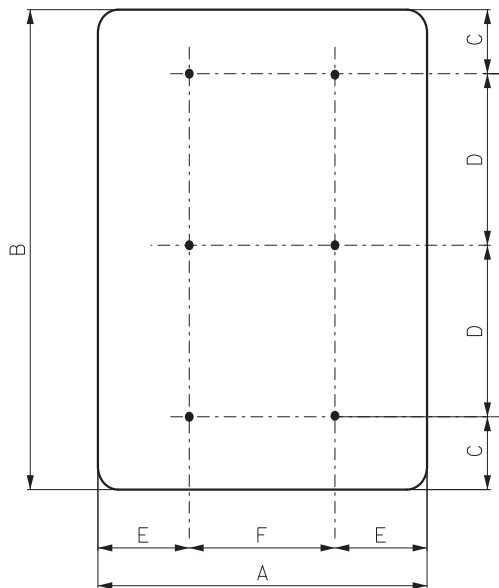
| DIMENSIONS (IN.) | | | |
|------------------|-----|----|--------|
| A | B | C | RADIUS |
| 12 | 1.5 | 9 | 1.5 |
| 18 | 3 | 12 | 1.5 |
| 24 | 3 | 18 | 1.5 |
| 30 | 3 | 24 | 1.875 |
| 36 | 6 | 24 | 2.25 |



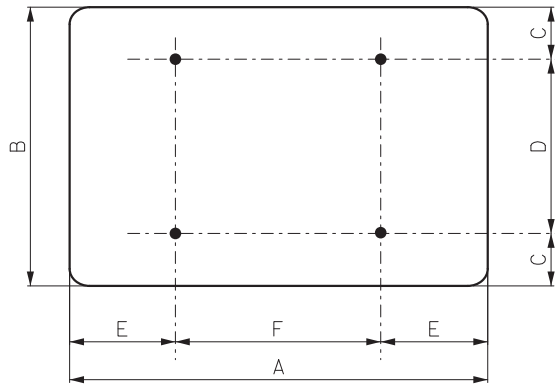
| DIMENSIONS (IN.) | | | |
|------------------|---|----|--------|
| A | B | C | RADIUS |
| 48 | 6 | 18 | 3 |



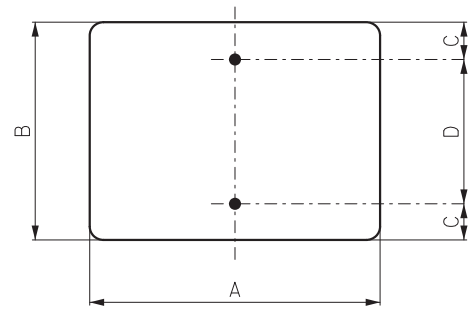
| DIMENSIONS (IN.) | | | | |
|------------------|----|---|----|--------|
| A | B | C | D | RADIUS |
| 4 | 72 | 6 | 30 | SQ |
| 12 | 72 | 6 | 30 | 1.5 |
| 18 | 60 | 6 | 24 | 1.5 |
| 24 | 48 | 6 | 18 | 1.5 |
| 36 | 48 | 6 | 18 | 2.25 |
| 36 | 60 | 6 | 24 | 2.25 |
| 36 | 72 | 6 | 30 | 2.25 |



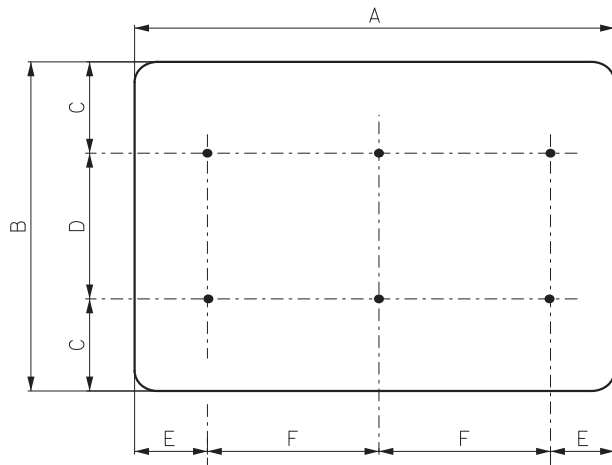
| DIMENSIONS (IN.) | | | | | | |
|------------------|----|---|----|---|----|--------|
| A | B | C | D | E | F | RADIUS |
| 48 | 60 | 6 | 24 | 9 | 30 | 3 |
| 48 | 72 | 6 | 30 | 9 | 30 | 3 |
| 48 | 84 | 6 | 36 | 9 | 30 | 3 |
| 48 | 96 | 6 | 42 | 9 | 30 | 3 |



| DIMENSIONS (IN.) | | | | | | |
|------------------|----|-----|----|----|----|--------|
| A | B | C | D | E | F | RADIUS |
| 48 | 12 | 1.5 | 9 | 9 | 30 | 1.5 |
| 48 | 18 | 1.5 | 15 | 9 | 30 | 1.5 |
| 48 | 24 | 3 | 18 | 9 | 30 | 1.5 |
| 48 | 30 | 3 | 24 | 9 | 30 | 1.875 |
| 48 | 36 | 6 | 24 | 9 | 30 | 2.25 |
| 54 | 18 | 1.5 | 15 | 9 | 36 | 1.5 |
| 60 | 12 | 1.5 | 9 | 12 | 36 | 1.5 |
| 60 | 18 | 1.5 | 15 | 12 | 36 | 1.5 |
| 60 | 24 | 3 | 18 | 12 | 36 | 1.5 |
| 60 | 30 | 3 | 24 | 12 | 36 | 1.875 |
| 60 | 36 | 6 | 24 | 12 | 36 | 2.25 |
| 60 | 48 | 6 | 36 | 12 | 36 | 3 |
| 72 | 36 | 6 | 24 | 12 | 48 | 2.25 |
| 72 | 48 | 6 | 36 | 12 | 48 | 3 |

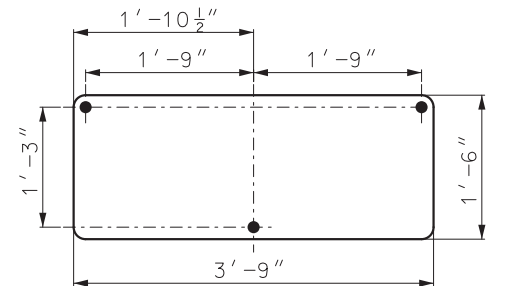
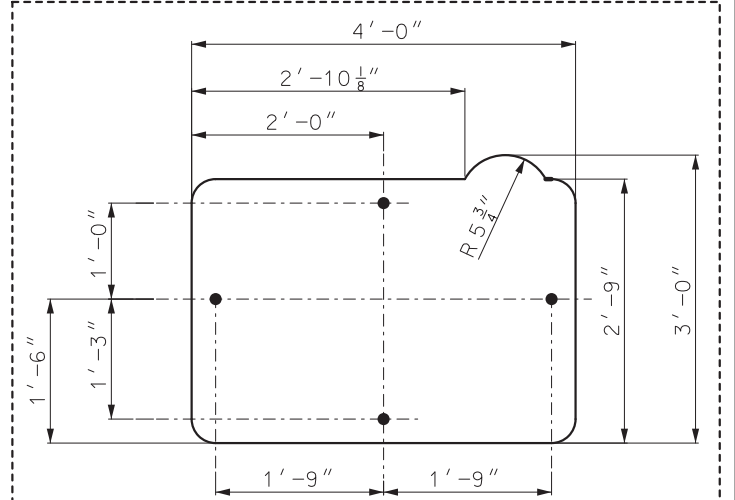


| DIMENSIONS (IN.) | | | | |
|------------------|----|-----|----|--------|
| A | B | C | D | RADIUS |
| 4 | 5 | 1.5 | 2 | 1.5 |
| 12 | 9 | 1.5 | 6 | 1.5 |
| 18 | 9 | 1.5 | 6 | 1.5 |
| 18 | 12 | 1.5 | 9 | 1.5 |
| 21 | 15 | 1.5 | 12 | 1.5 |
| 24 | 8 | 1.5 | 5 | 1.5 |
| 24 | 12 | 1.5 | 9 | 1.5 |
| 24 | 18 | 3 | 12 | 1.5 |
| 30 | 8 | 1.5 | 5 | 1.5 |
| 30 | 12 | 1.5 | 9 | 1.5 |
| 30 | 18 | 3 | 12 | 1.5 |
| 30 | 24 | 3 | 18 | 1.5 |
| 36 | 8 | 1.5 | 5 | 1.5 |
| 36 | 12 | 1.5 | 9 | 1.5 |
| 36 | 18 | 3 | 12 | 1.5 |
| 36 | 24 | 3 | 18 | 1.5 |
| 36 | 30 | 3 | 24 | 1.875 |
| 42 | 8 | 1.5 | 5 | 1.5 |
| 42 | 18 | 3 | 12 | 1.5 |
| 42 | 24 | 3 | 18 | 1.5 |
| 42 | 30 | 3 | 24 | 1.875 |
| 42 | 36 | 3 | 30 | 2.25 |
| 48 | 8 | 1.5 | 5 | 1.5 |

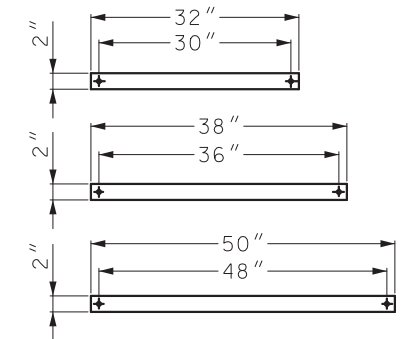


| DIMENSIONS (IN.) | | | | | | |
|------------------|----|---|----|----|----|--------|
| A | B | C | D | E | F | RADIUS |
| 84 | 24 | 3 | 18 | 12 | 30 | 3 |
| 96 | 48 | 6 | 36 | 16 | 32 | 3 |

| DIMENSIONS (IN.) FOR SIGNS REQUIRING NO HOLE PUNCHING | | |
|---|----|--------|
| A | B | RADIUS |
| 66 | 18 | 1.5 |
| 72 | 18 | 1.5 |
| 78 | 18 | 1.5 |
| 84 | 18 | 1.5 |
| 90 | 18 | 1.5 |
| 96 | 18 | 1.5 |
| 36 | 78 | 2.25 |



ADOPT A HIGHWAY
PRIMARY SIGN AND
NAME PANEL



BACKING BARS FOR SINGLE POST SIGNS

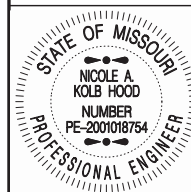
GENERAL NOTES:

REFER TO GENERAL NOTES ON SHEET 6 OF 8.



MISSOURI HIGHWAYS AND TRANSPORTATION
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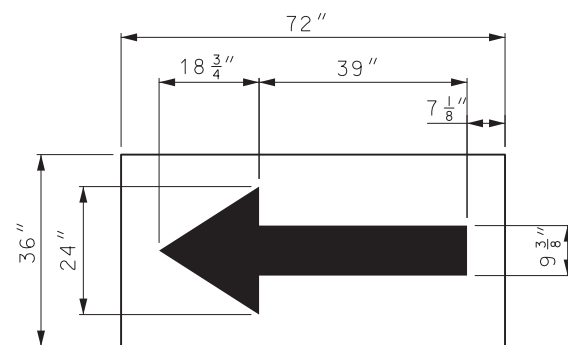
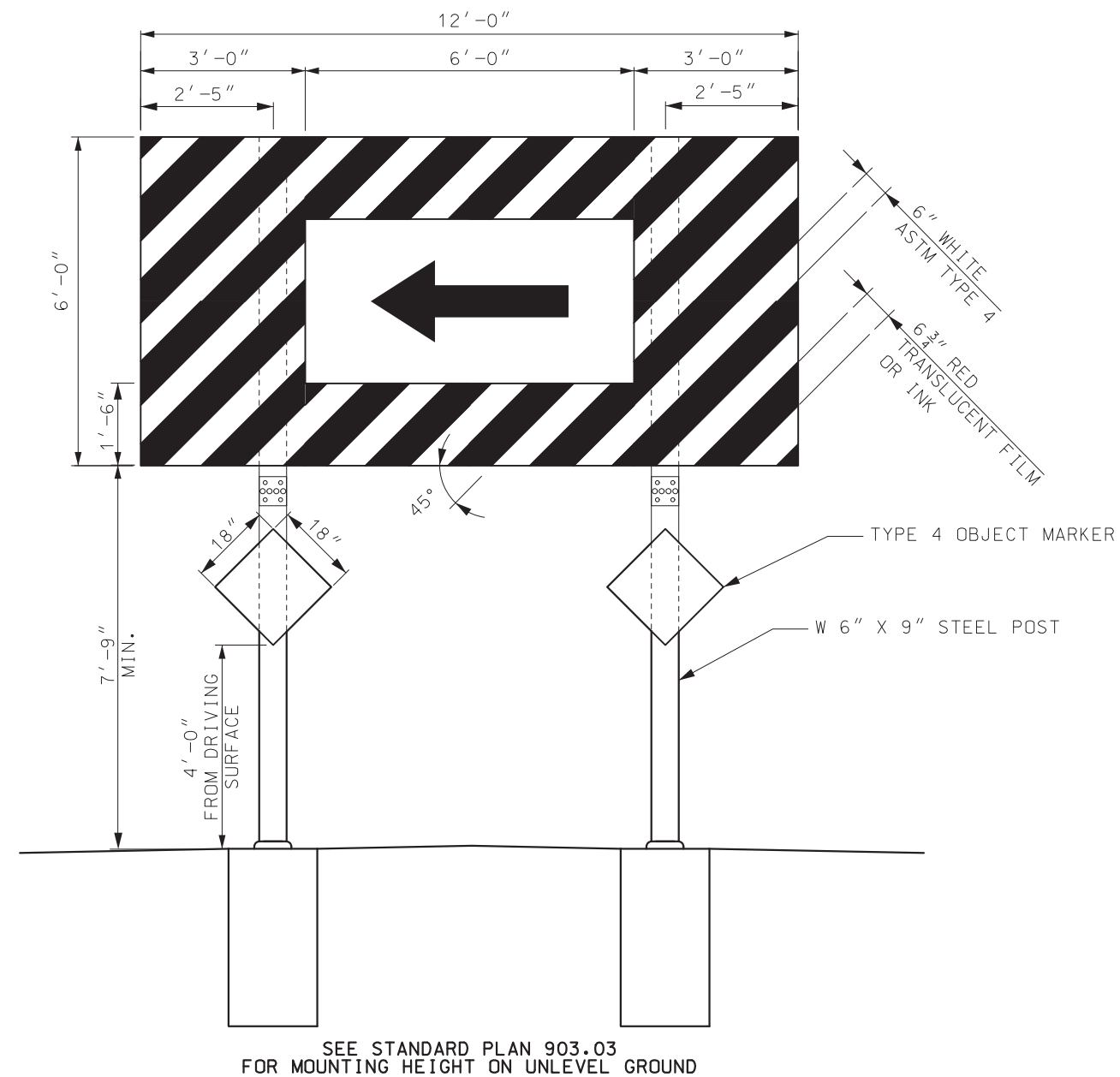
THIS SHEET HAS BEEN
SIGNED, SEALED, AND DATED
ELECTRONICALLY.

HIGHWAY SIGNING
HOLE PUNCHING

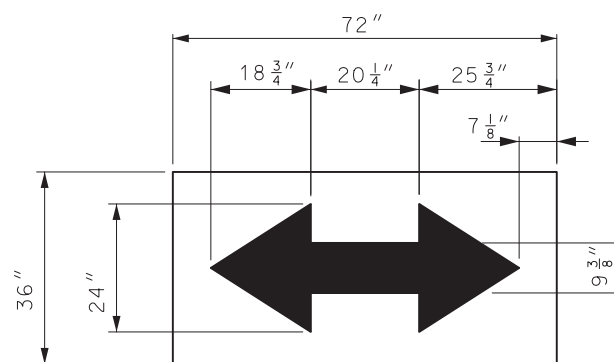
DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.02AP

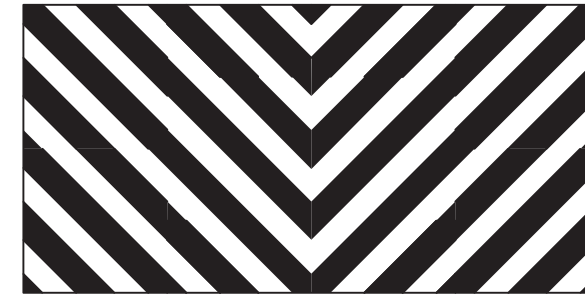
SHEET NO.
7 OF 8



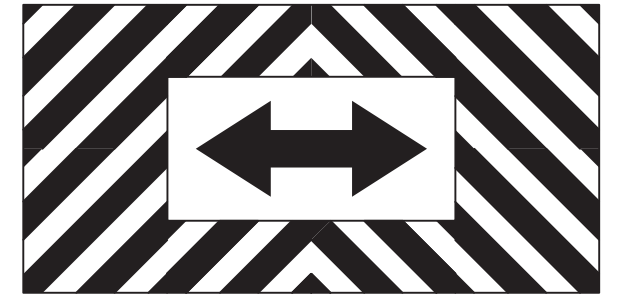
W1-6



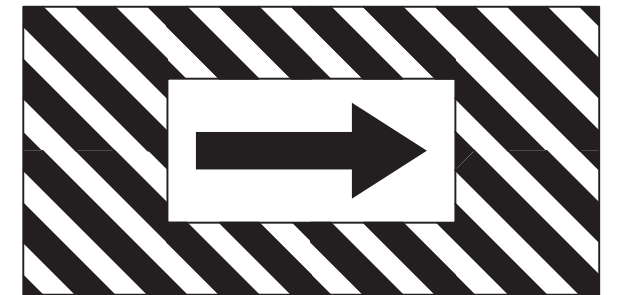
W1-7



DEAD END



T-INTERSECTION



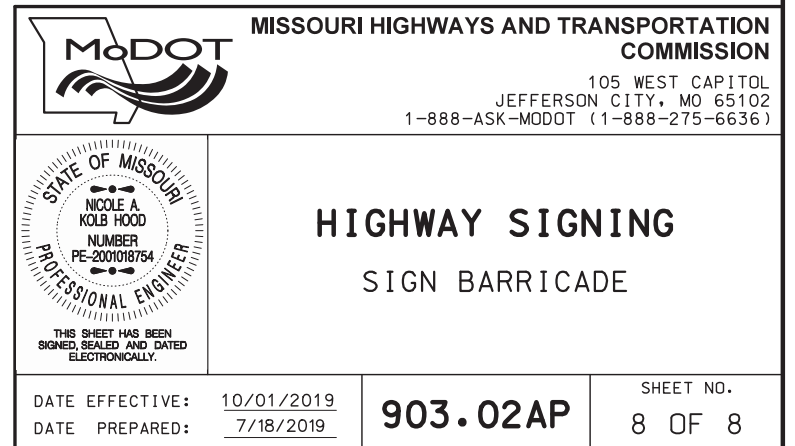
GENERAL NOTES:

SEE STANDARD PLAN 903.03 FOR WIDE FLANGE
INSTALLATION.

SIGN BARRICADE SHALL BE CONSTRUCTED AS A
STRUCTURAL (ST) SIGN.

DIRECTIONAL ARROWS SHALL BE SHF AND
CONSIDERED INCIDENTAL TO THE SIGN.

ALL REFLECTORIZED SURFACES SHALL BE RETROREFLECTIVE SHEETING IN ACCORDANCE WITH SEC 1042.



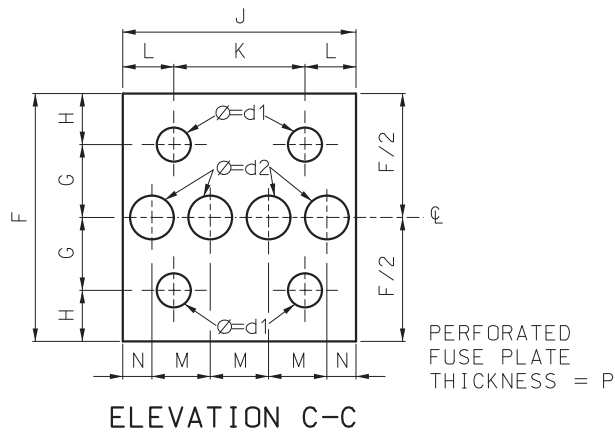
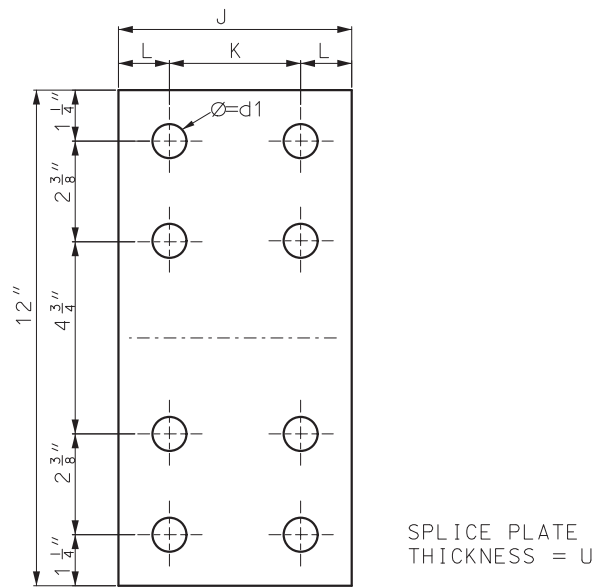
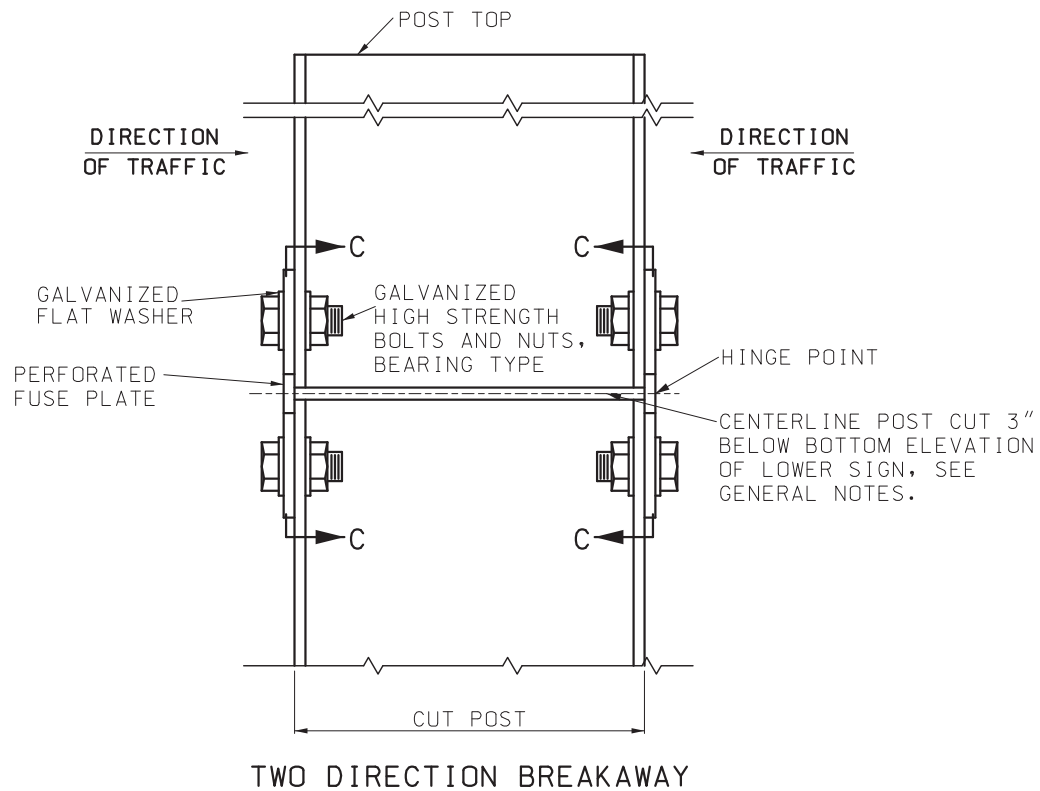
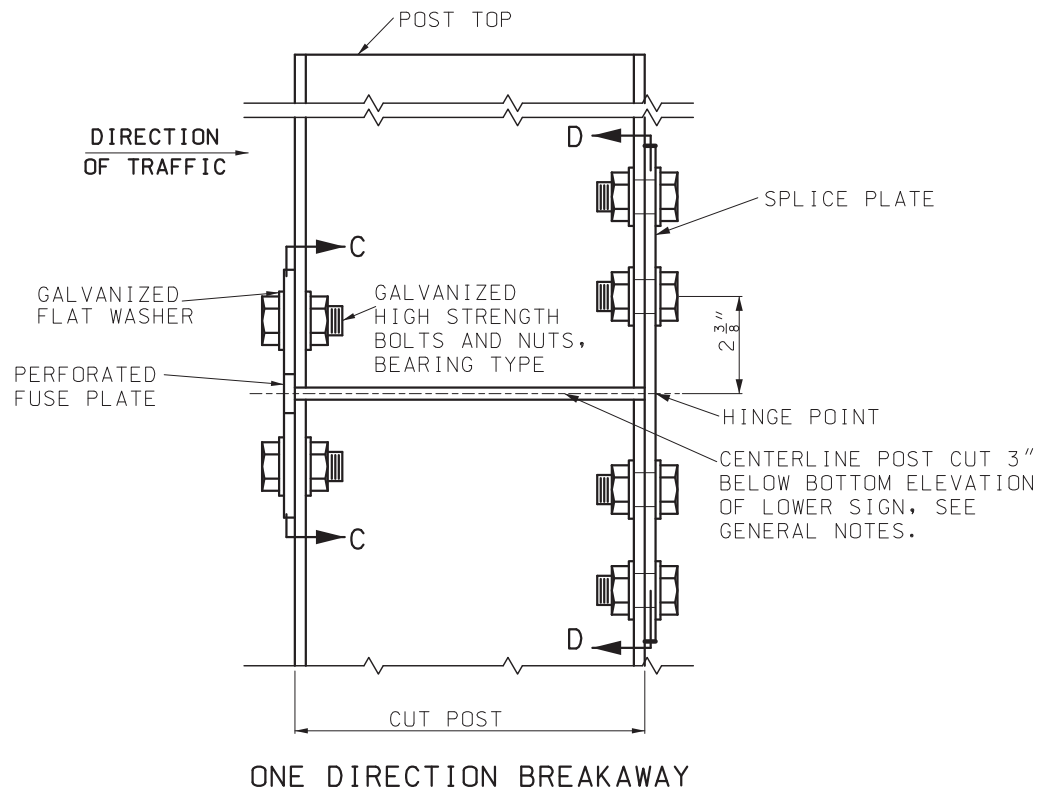
DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.02AP

SHEET NO.
8 OF 8

| WIDE FLANGE STRUCTURAL STEEL POSTS DESIGN DATA | | | | | | | | PERFORATED FUSE PLATE DATA TABLE | | | | | | | | | | | | | | | | SPLICE PLATE DATA TABLE | | | | | | | | | |
|--|-----------------------|--------|-------|--------------------------------|-------------------------------|------------------------------|------------------------------|----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|------------------------------|-----------------------------|------------------------|-----------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------|---------------------------------|-------------------------------|-----------------------------|--|
| POST DES. NO. | NOM. SIZE (IN.) | WEIGHT | | DEPTH (IN.) | FLANGE | | WEB THICK (IN.) | POST DESIGN NO. | F (IN.) | G (IN.) | H (IN.) | J (IN.) | K (IN.) | L (IN.) | M (IN.) | N (IN.) | d1 (IN.) | d2 (IN.) | P (IN.) | BOLT DIA. (IN.) | WT. (EA.) (LBS.) | POST DESIGN NO. | J (IN.) | K (IN.) | L (IN.) | U (IN.) | d1 (IN.) | BOLT DIA. (IN.) | WT. (EA.) (LBS.) | WASHER | | | |
| | | LB/FT | LB/IN | | WIDTH (IN.) | THICK (IN.) | | | | | | | | | | | | | | | | | | | | | | | | OD IN. | ID IN. | THICK IN. | |
| 1 | W6 | 9 | 0.75 | 5 ⁷ / ₈ | 4 | ³ / ₁₆ | ³ / ₁₆ | 1 | 4 ¹ / ₄ | 1 | 1 ¹ / ₈ | 4 | 2 ¹ / ₄ | ⁷ / ₈ | 1 | ¹ / ₂ | ⁹ / ₁₆ | ³ / ₄ | ³ / ₁₆ | ¹ / ₂ | 0.76 | 1 | 4 | 2 ¹ / ₄ | ⁷ / ₈ | ³ / ₁₆ | ⁹ / ₁₆ | ¹ / ₂ | 2.45 | 1 ³ / ₁₆ | ⁵ / ₈ | ¹ / ₈ | |
| 2 | W6 | 15 | 1.25 | 6 | 6 | ¹ / ₄ | ¹ / ₄ | 2 | 5 | 1 ¹ / ₄ | 1 ¹ / ₄ | 6 | 3 ¹ / ₂ | 1 ¹ / ₄ | 1 ¹ / ₂ | ³ / ₄ | ¹¹ / ₁₆ | 1 ¹ / ₄ | ¹ / ₄ | ⁵ / ₈ | 1.67 | 2 | 6 | 3 ¹ / ₂ | 1 ¹ / ₄ | ¹ / ₄ | ¹¹ / ₁₆ | ⁵ / ₈ | 4.89 | 1 ⁵ / ₁₆ | ¹¹ / ₁₆ | ¹ / ₈ | |
| 3 | W8 | 18 | 1.50 | 8 ¹ / ₈ | 5 ¹ / ₄ | ⁵ / ₁₆ | ¹ / ₄ | 3 | 5 | 1 ¹ / ₄ | 1 ¹ / ₄ | 5 ¹ / ₄ | 2 ³ / ₄ | 1 ¹ / ₄ | 1 ¹ / ₄ | ³ / ₄ | ¹¹ / ₁₆ | 1 ¹ / ₁₆ | ¹ / ₄ | ⁵ / ₈ | 1.51 | 3 | 5 ¹ / ₄ | 2 ³ / ₄ | 1 ¹ / ₄ | ⁵ / ₁₆ | ¹¹ / ₁₆ | ⁵ / ₈ | 5.32 | | | | |
| 4 | W10 | 22 | 1.83 | 10 ¹ / ₈ | 5 ³ / ₄ | ³ / ₈ | ¹ / ₄ | 4 | 6 | 1 ¹ / ₂ | 1 ¹ / ₂ | 5 ³ / ₄ | 2 ³ / ₄ | 1 ¹ / ₂ | 1 ³ / ₈ | ¹³ / ₁₆ | ¹³ / ₁₆ | 1 ¹ / ₈ | ⁵ / ₁₆ | ³ / ₄ | 2.52 | 4 | 5 ³ / ₄ | 2 ³ / ₄ | 1 ¹ / ₂ | ⁵ / ₁₆ | ¹³ / ₁₆ | ³ / ₄ | 5.75 | 1 ¹⁵ / ₃₂ | ¹³ / ₁₆ | ¹ / ₈ | |
| 5 | W10 | 26 | 2.17 | 10 ³ / ₈ | 5 ³ / ₄ | ⁷ / ₁₆ | ¹ / ₄ | 5 | 6 | 1 ¹ / ₂ | 1 ¹ / ₂ | 5 ³ / ₄ | 2 ³ / ₄ | 1 ¹ / ₂ | 1 ³ / ₈ | ¹³ / ₁₆ | ¹³ / ₁₆ | 1 ¹ / ₈ | ⁵ / ₁₆ | ³ / ₄ | 2.52 | 5 | 5 ³ / ₄ | 2 ³ / ₄ | 1 ¹ / ₂ | ⁷ / ₁₆ | ¹³ / ₁₆ | ³ / ₄ | 8.04 | | | | |
| 6 | W12 | 35 | 2.92 | 12 ¹ / ₂ | 6 ¹ / ₂ | ¹ / ₂ | ⁵ / ₁₆ | 6 | 6 | 1 ¹ / ₂ | 1 ¹ / ₂ | 6 ¹ / ₂ | 3 ¹ / ₂ | 1 ¹ / ₂ | 1 ⁵ / ₈ | ¹³ / ₁₆ | ¹³ / ₁₆ | 1 ⁵ / ₁₆ | ³ / ₈ | ³ / ₄ | 3.35 | 6 | 6 ¹ / ₂ | 3 ¹ / ₂ | 1 ¹ / ₂ | ¹ / ₂ | ¹³ / ₁₆ | ³ / ₄ | 10.47 | | | | |


THE WEIGHT OF STRUCTURAL STEEL POSTS SHOWN IN THE CONTRACT HAS BEEN COMPUTED USING THE WEIGHTS SHOWN.



ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS. HOWEVER: FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND.


PERFORATED FUSE PLATE AND SPICE PLATE SHALL BE FABRICATED FROM ASTM A 36 STRUCTURAL STEEL.

NOTES:
FOR GENERAL NOTES, SEE SHEET 1 OF 16.
FOR ROADWAYS WHERE TRAFFIC MAY STRIKE THE BACKSIDE OF THE POST, PERFORATED FUSE PLATES SHALL BE INSTALLED ON BOTH SIDES OF THE POST.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)



STATE OF MISSOURI
NICOLE A. KOLB HOOD
NUMBER
PE-2001018754
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

POST INSTALLATION DETAILS

HINGE DETAILS

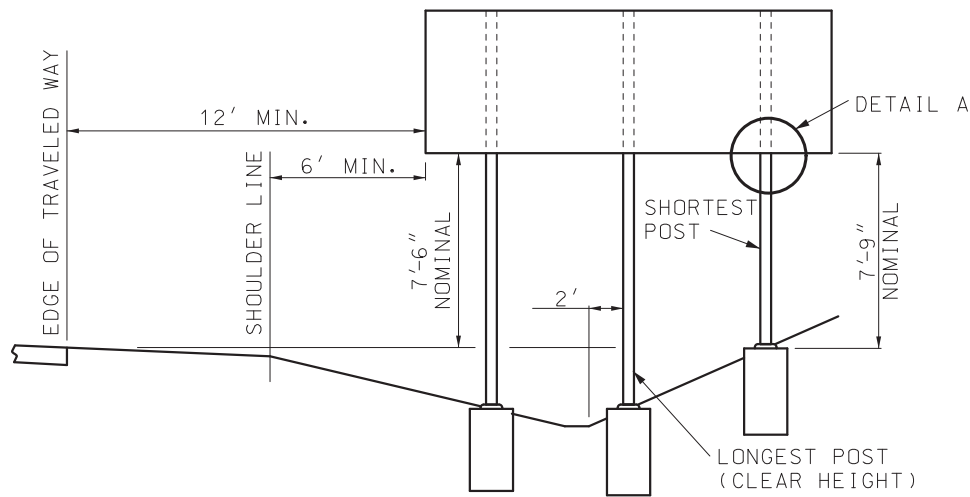
WIDE FLANGE (WF) POSTS

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

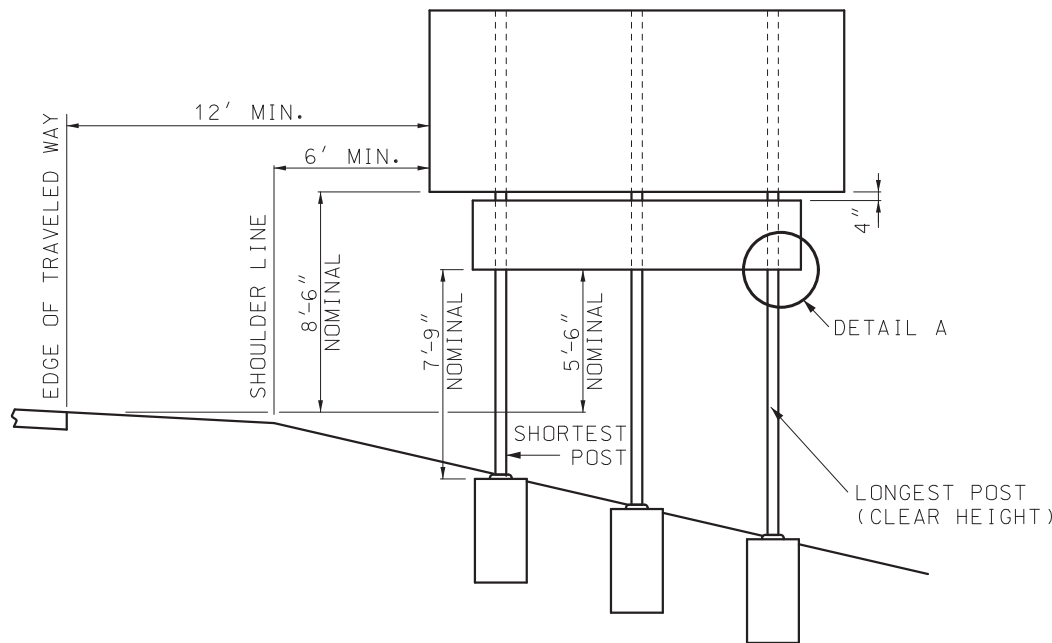
903.03BM

SHEET NO.
2 OF 16

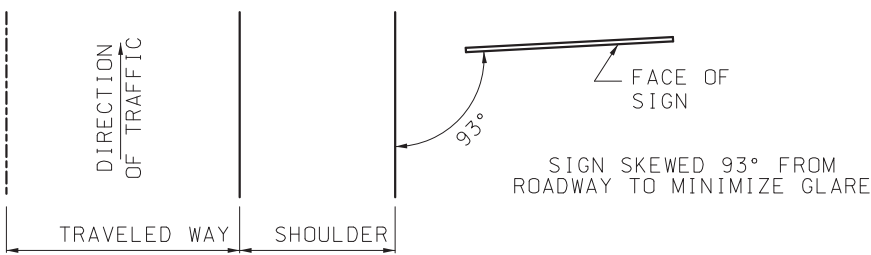
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



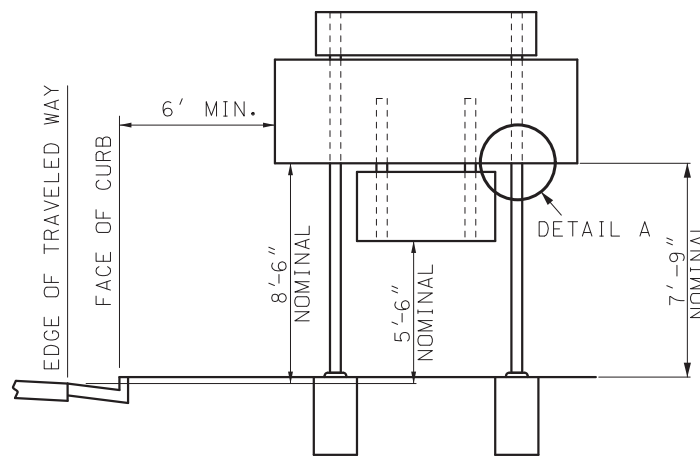
DITCH SECTION



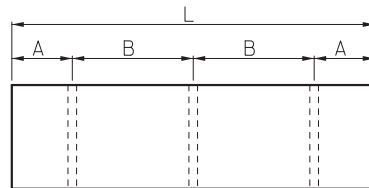
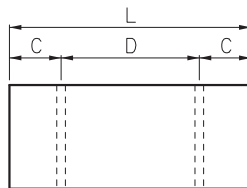
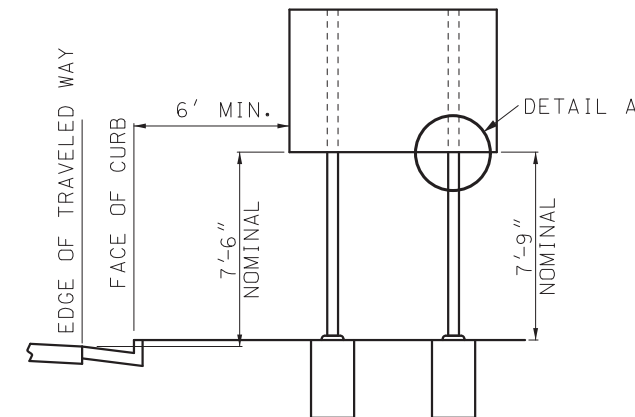
FILL SECTION



SIGN ORIENTATION



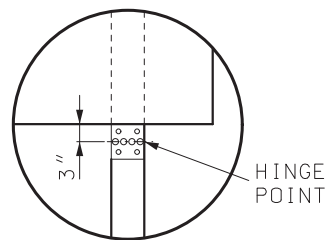
BARRIER CURB SECTIONS



$$A = \frac{1}{6}(L) \quad C = \frac{1}{5}(L)$$

$$B = \frac{1}{3}(L) \quad D = \frac{3}{5}(L)$$

POST SPACING



DETAIL A

NOTE: SEE SHEET 2 FOR FUSE PLATE DETAILS.

FOR POST DESIGNS NUMBERS 3, 4, 5 AND 6 HAVING WEIGHTS GREATER THAN 18LBS./FT., POSTS SHALL BE SPACED AT LEAST 7' APART.

FOR POST DESIGNS NUMBERS 1 AND 2, POSTS MAY BE SPACED LESS THAN 7' APART.

DO NOT USE THREE NUMBER 1 OR 2 POSTS FOR L LESS THAN 11'.

FOR L GREATER THAN 11' AND LESS THAN 17', 3 POSTS MAY BE USED DEPENDING ON SOIL CONDITIONS.

FOR L OF 6' TO 17' TYPICALLY USE 2 POSTS.

FOR L GREATER THAN 17' TYPICALLY USE 3 POSTS.

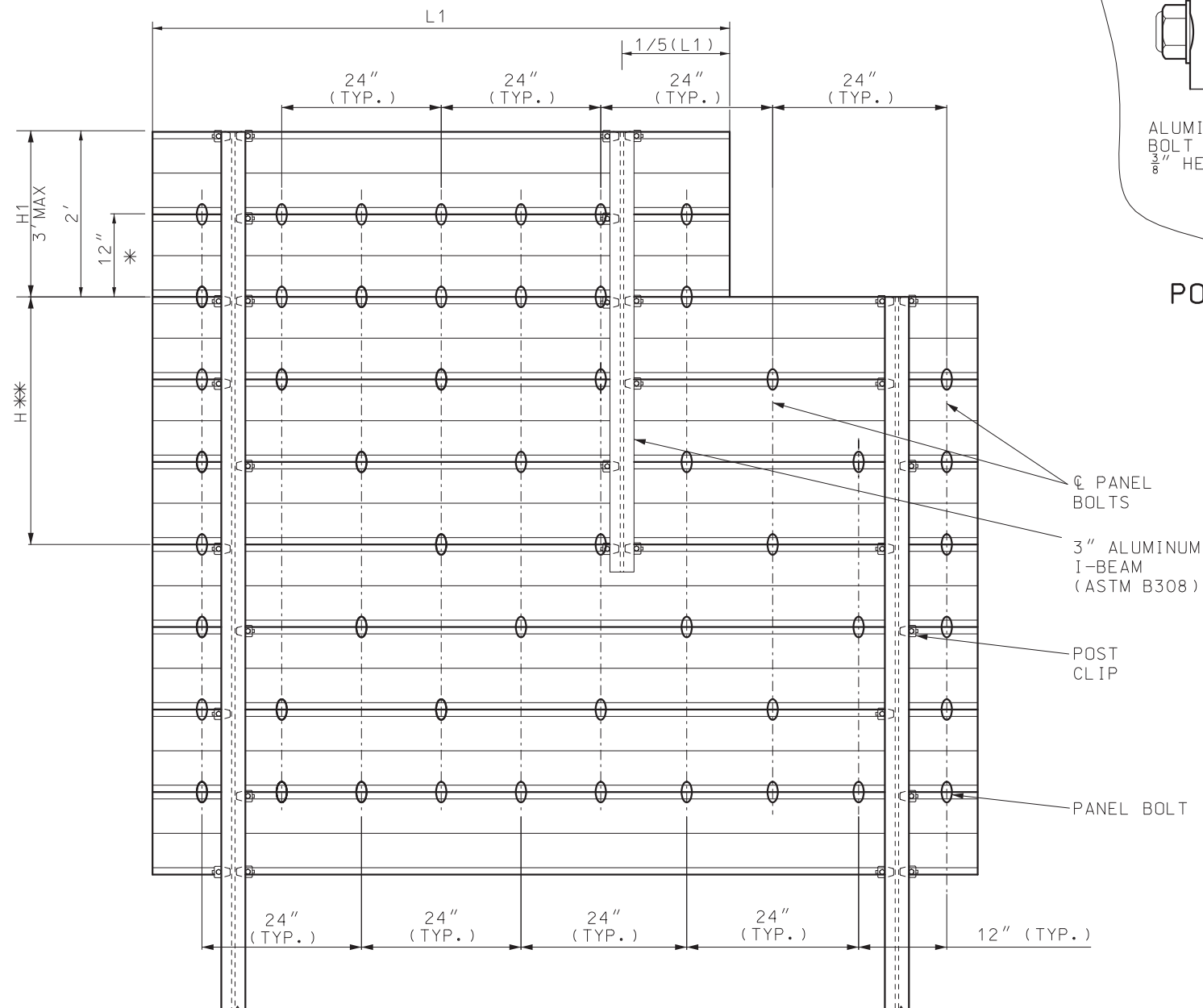
GENERAL NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 7'-9" MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

POST SIZE IS DETERMINED USING SIGN HEIGHT, SIGN WIDTH AND CLEAR HEIGHT. THE CLEAR HEIGHT IS EQUAL TO THE LENGTH OF THE LONGEST POST MEASURED FROM THE GROUND TO THE BOTTOM OF THE SIGN.

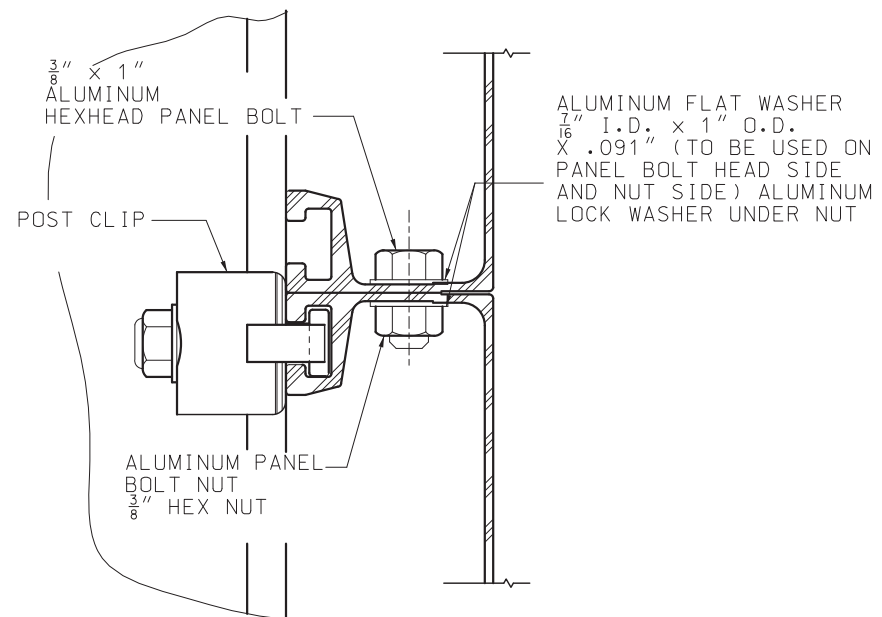
| | |
|---|---|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>POST INSTALLATION DETAILS</p> <p>TYPICAL SECTION, MOUNTING HEIGHT AND POST SPACING WIDE FLANGE (WF) POSTS</p> |
| <p>DATE EFFECTIVE: 10/01/2019</p> <p>DATE PREPARED: 7/18/2019</p> | <p>903.03BM</p> |
| <p>SHEET NO. 3 OF 16</p> | |



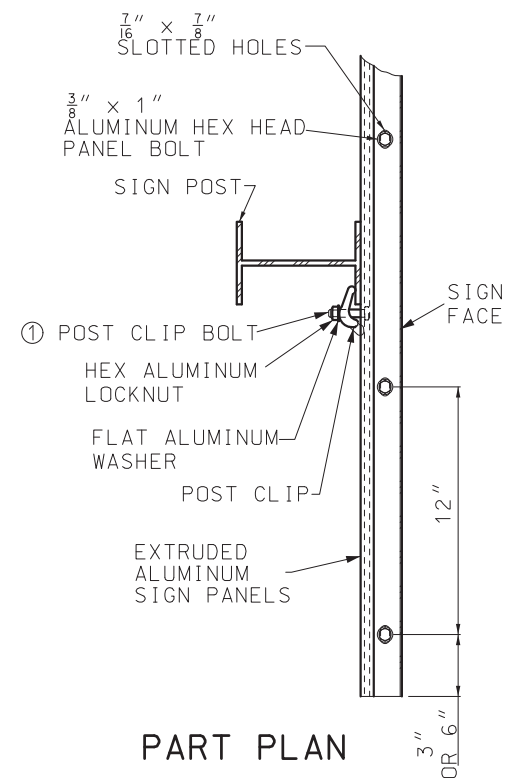
PANEL BOLT LOCATION

* EXTRUDED ALUMINUM PANEL.

** H = H1 + 12". H APPLIES TO SIGNS SUSPENDED ABOVE OR BELOW THE PRIMARY SIGN IF SECONDARY SIGN IS NOT ATTACHED TO THE MAIN SIGN POSTS.



POST CLIP DETAIL



PART PLAN

① SIGNS SHALL BE FIELD ATTACHED TO POSTS WITH POST CLIPS AND BOLTS, SEE POST CLIP DETAIL. THE SHANK OF THE POST CLIP BOLT SHALL FIT TIGHTLY AGAINST THE POST FLANGE AFTER THE LOCKNUTS ARE TORQUED. LOCKNUTS ON THE POST CLIP BOLTS SHALL BE TORQUED TO 225 INCH-POUNDS WHEN USING DRY, CLEAN, UNLUBRICATED THREADS.

NOTES:

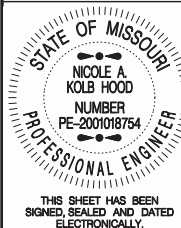
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

FOR EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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SIGN MOUNTING DETAILS

WIDE FLANGE (WF) POSTS

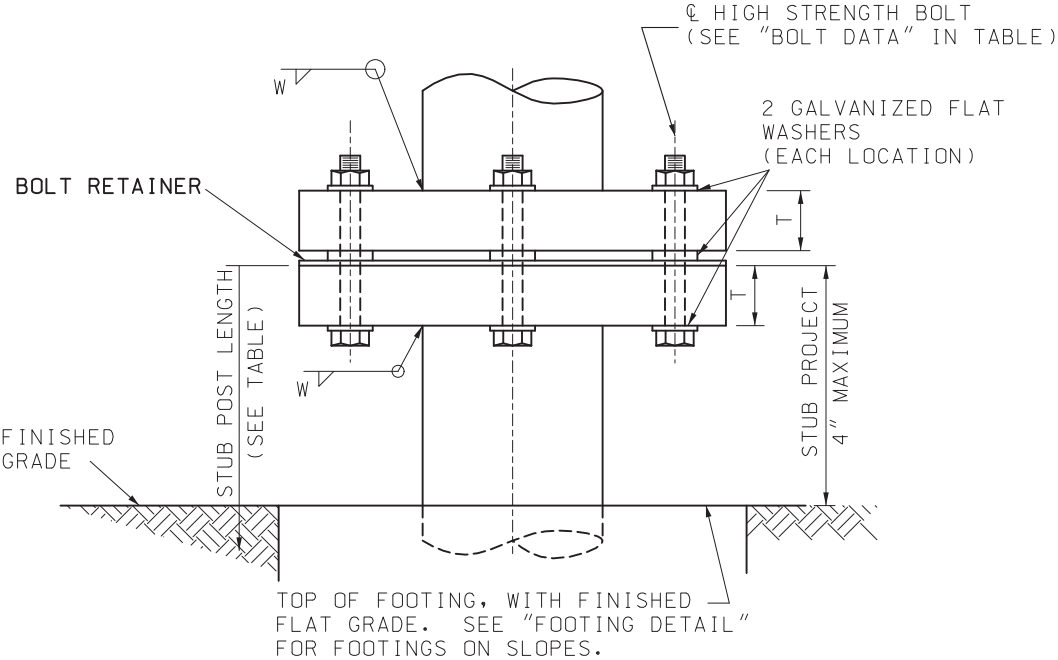
DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.03BM

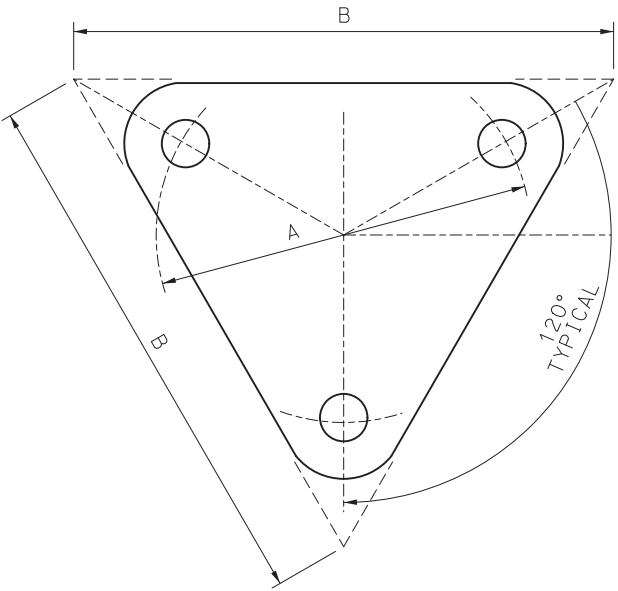
SHEET NO.
4 OF 16

| ROUND PIPE POST FOR GROUND MOUNTED SIGNS | | | | | | | | | | | | |
|--|------------|---------------|-------------------|-----------|-----------|--------------|----------------------------------|----|-----|------|---|------|
| POST | BOLT | | | WASHER | | | BASE CONNECTION DATA TABLE (IN.) | | | | | |
| NOM SIZE (IN.-ID) | DIA IN. | LENGTH IN. | TORQUE IN.-LB. | OD IN. | ID IN. | THICK IN. | A | B | C | R | T | W |
| 2 1/2 | 1/2 | 3 1/2 | 140 | 1 1/16 | 17/32 | 1/8 | 6 1/4 | 9 | 1/4 | 9/32 | 1 | 1/4 |
| 3 | | | | | | | | | | | | |
| 4 | 5/8 | 3 3/4 | 345 | 1 5/16 | 11/16 | 1/8 | 7 3/16 | 10 | 1/4 | 3/8 | 1 | 5/16 |

| ROUND PIPE POST AND FOOTING DATA TABLE | | | | | | |
|--|--------|--------|----------------|---------|-------|------------------|
| NOM. SIZE (IN.) | WEIGHT | | STUB LENGTH | FOOTING | | CONCRETE C.Y. |
| | LBS/FT | LBS/IN | | DIA. | DEPTH | |
| 2 1/2 | 5.79 | 0.48 | 4'- 3 1/2" | 12" | 4'-6" | 0.13 |
| 3 | 7.58 | 0.63 | 4'- 3 1/2" | 12" | 4'-6" | 0.13 |
| 4 | 10.79 | 0.90 | 5'- 3 1/2" | 18" | 5'-6" | 0.36 |

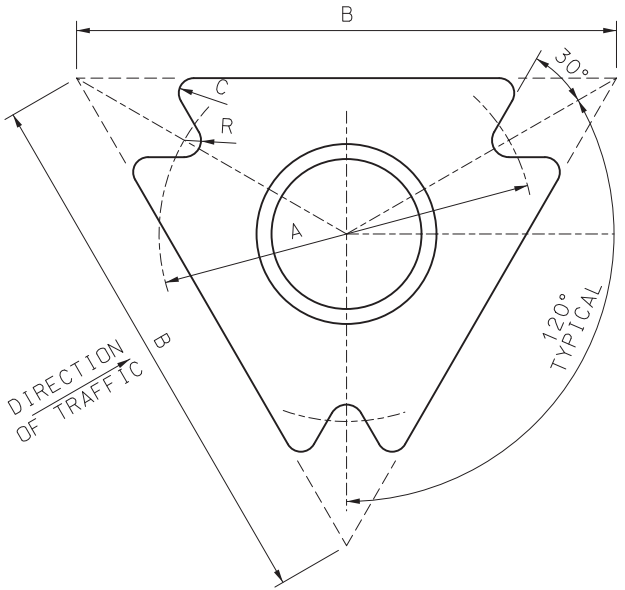


ELEVATION
(STEEL PIPE POST BASE CONNECTION)
MULTI-DIRECTION SLIP BASE



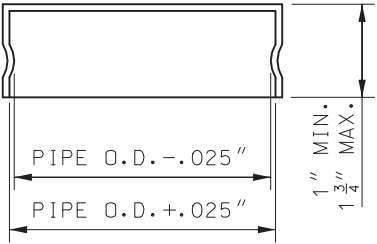
BOLT RETAINER

SHEET METAL BOLT RETAINER CUT FROM 30 GAUGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES SHALL BE 1/16" LARGER THAN REQUIRED BOLT SIZE.



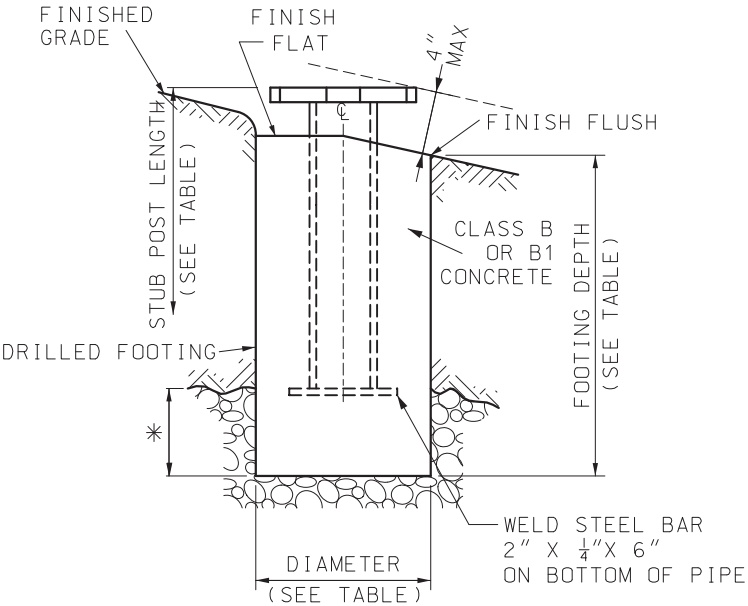
PLAN VIEW

ROLLED CRIMP TO ENGAGE PIPE O.D.



FRICTION CAP

NOTE:
FOR GENERAL NOTES, SEE SHEET 1 OF 16.
FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE STANDARD PLANS SHEET 10 OF 16.



FOOTING DETAIL

* PIPE 3" DIA. AND UNDER:
2' MAXIMUM IN ROCK,
PIPE OVER 3" DIA.:
3' MAXIMUM IN ROCK

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

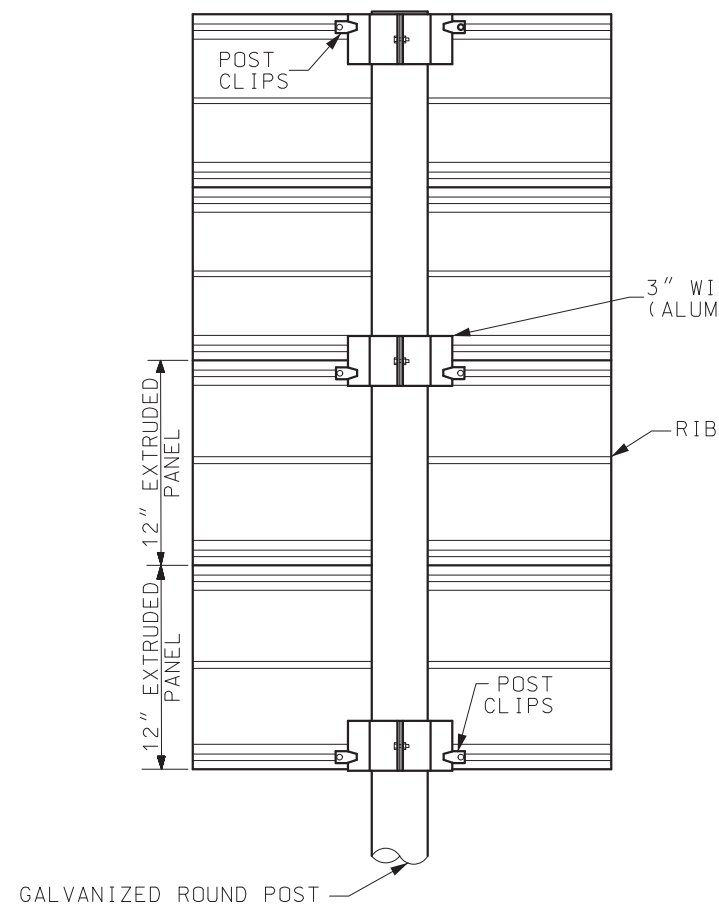
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POST INSTALLATION DETAILS
PIPE POST

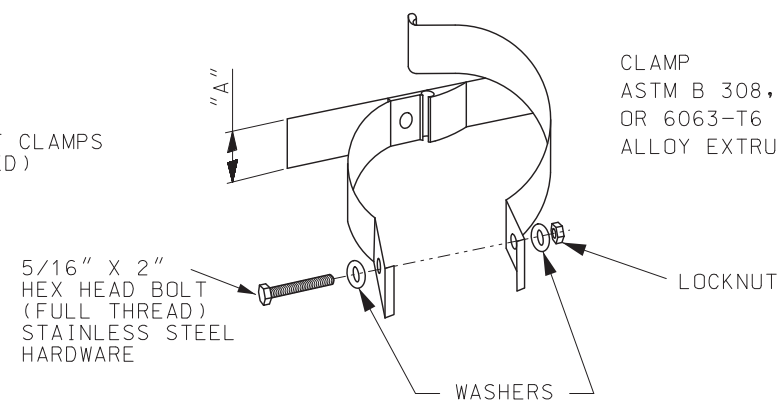
DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.03BM

SHEET NO.
5 OF 16

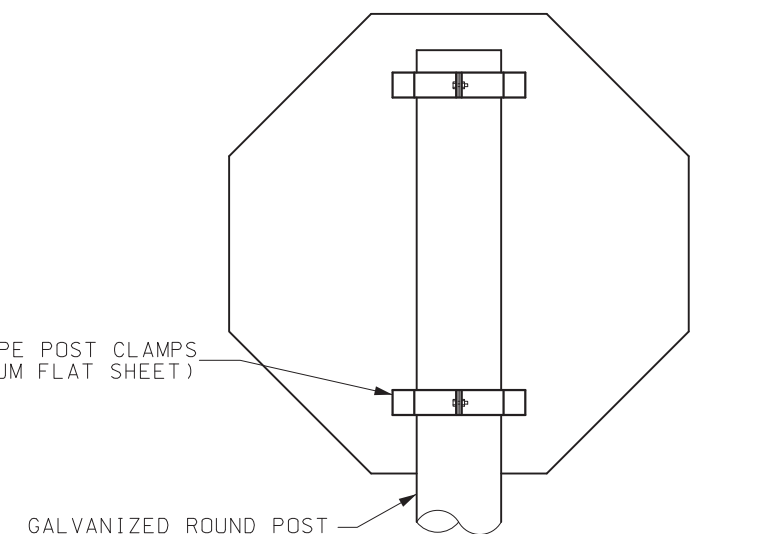


PROFILE VIEW

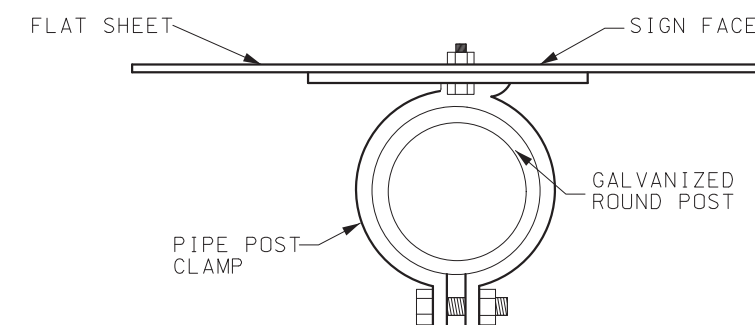


CLAMP TYPE SIGN SUPPORT
FOR PIPE POST

| WIDTH OF PIPE POST CLAMP | |
|--------------------------|-------------|
| SIGN TYPE | MINIMUM "A" |
| FLAT | 1 1/4" |
| STRUCTURAL | 3" |



PROFILE VIEW



PLAN VIEW

MOUNTING DETAILS FOR FLAT SHEET ON PIPE POST

NOTES:

FOR GENERAL NOTES, SHEET 1 OF 16.

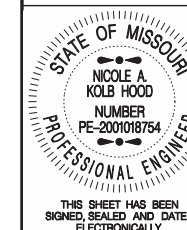
FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.

FOR DETAILS OF EXTRUDED ALUMINUM PANEL AND POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.



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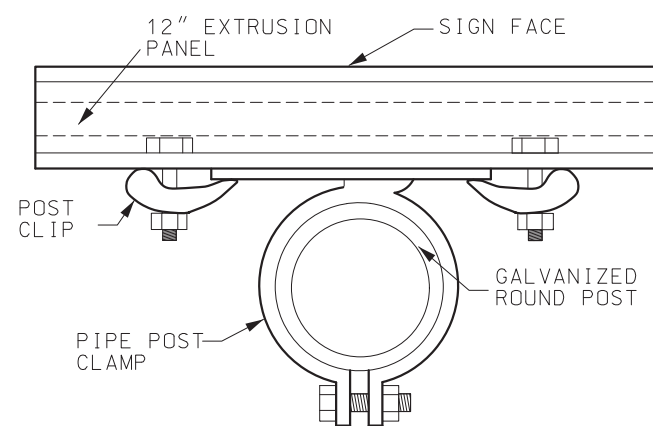


DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

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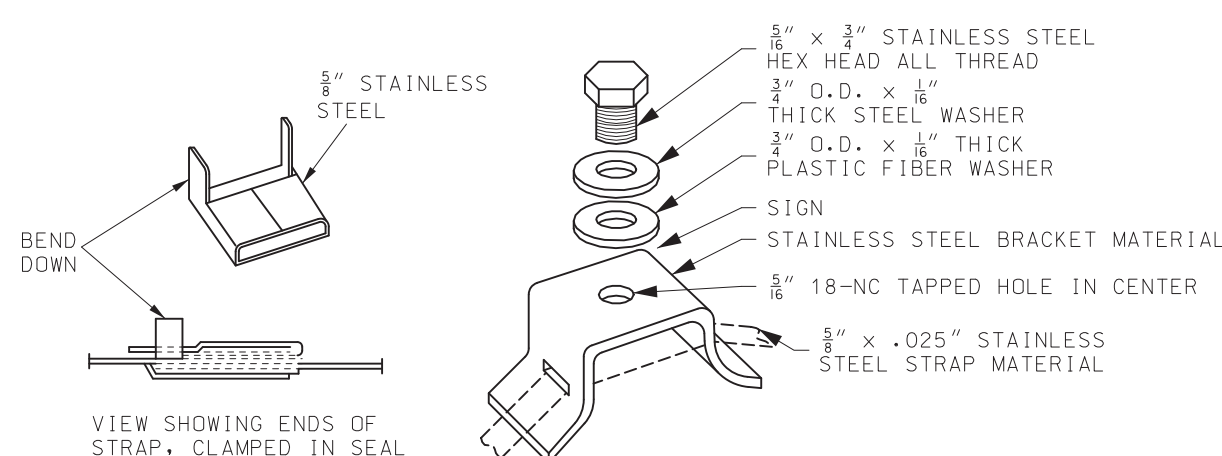
SHEET NO.
6 OF 16

SIGN MOUNTING DETAILS PIPE POST



PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON PIPE POST

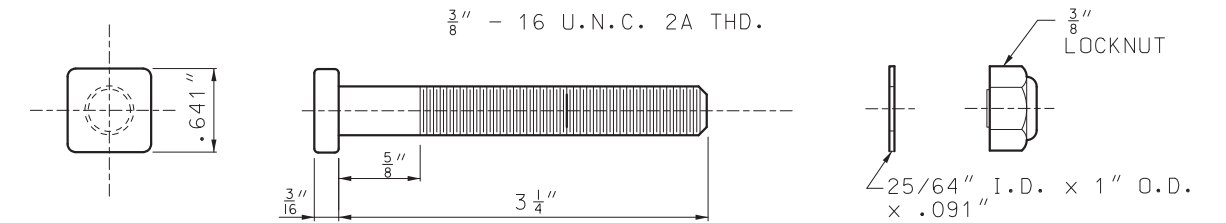
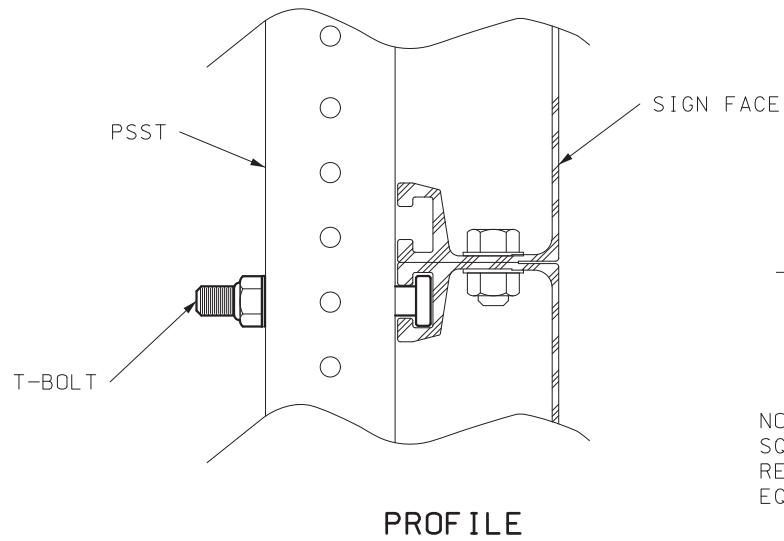
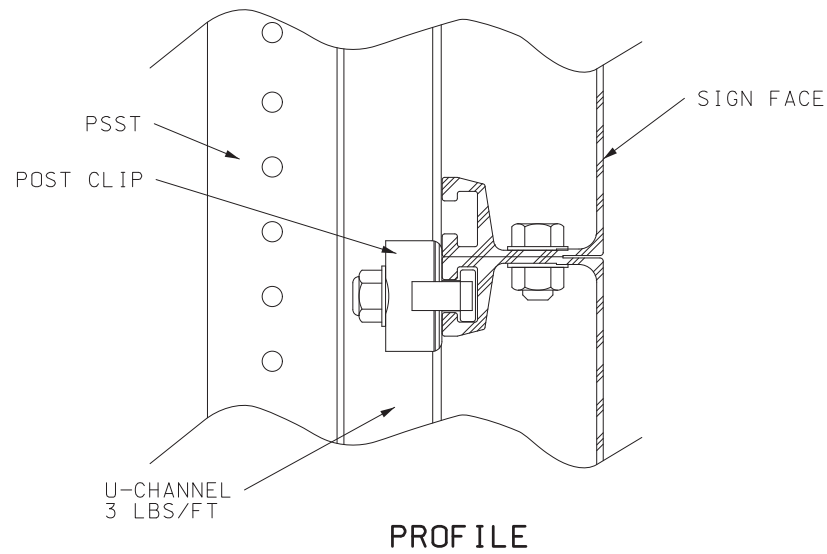


STRAP SEAL

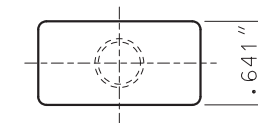
FLARED LEG SIGN BRACKET

MOUNTING DETAILS FOR FLAT SHEET SIGNS ON ROUND STRUCTURES >4" PIPE POST

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



NOTE:
SQUARE BOLT HEAD SHOWN MAY BE REPLACED WITH
RECTANGULAR BOLT HEAD WITH THE NARROW DIMENSION
EQUAL TO .641".



BOLT - 1 3/4 x ALUMINUM
BOLT - 3 1/4 x ALUMINUM
HEX LOCKNUT - 3/8" ALUMINUM
WASHER - ALUMINUM

T-BOLT DETAIL

NOTES:
- ALUMINUM BOLTS SHALL BE ASTM B 211, 2024-T4 OR 6061-T6
- ALUMINUM FLAT WASHERS SHALL BE ASTM B 209, ALCLAD 2024-T4 OR 2024-T4
- ALUMINUM LOCK NUTS (NYLON INSERT) SHALL BE ASTM B 211 OR 2017-T4

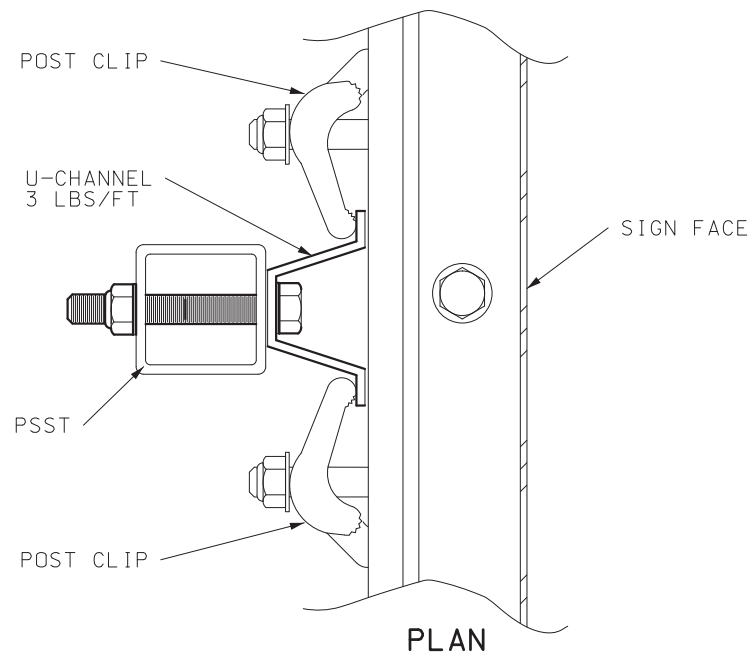
NOTES:

FOR THE GENERAL NOTES, SEE SHEET 1 OF 16.

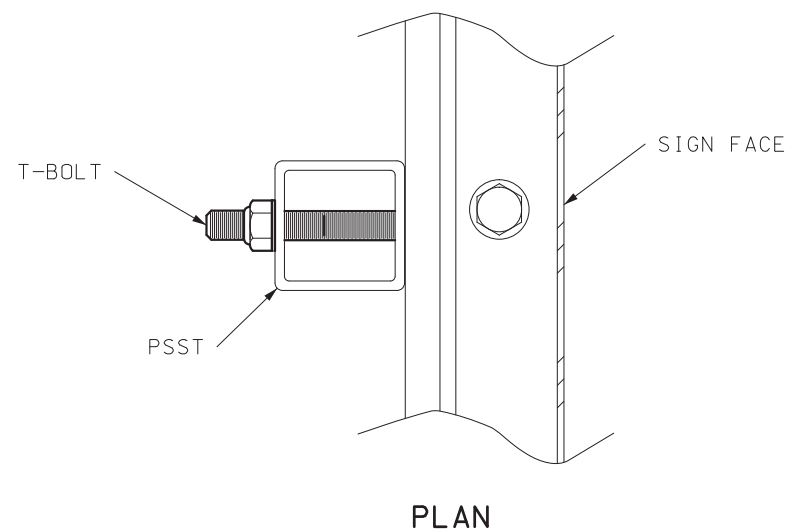
FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE
SHEET 10 OF 16.

FOR POST CLIP DETAILS, SEE STANDARD PLANS
903.02 SHEET 4 OF 7.

ALTERNATE PSST MOUNTING HARDWARE USE SHALL
BE ON APPROVED LIST.



POST CLIP METHOD



T-BOLT METHOD

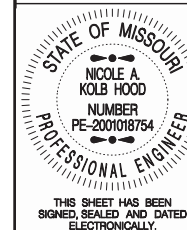
EXTRUDED PANEL MOUNTING DETAIL

| NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO PSST POST | |
|--|------------------------------------|
| SIGN HEIGHT | NO. OF BOLTS PER PSST POST USED |
| 1' | 2 |
| 2' | 3 |
| 3' | 4 |
| 4' | 5 |
| 5' | 6 |
| 6' | 7 |
| 7' | 8 |



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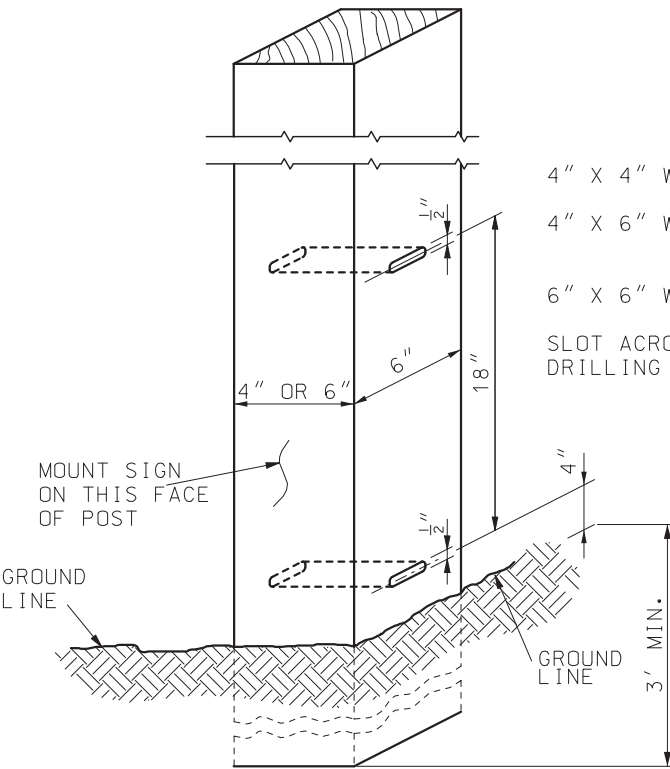


SIGN MOUNTING DETAILS
PERFORATED SQUARE
STEEL TUBE (PSST)

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.03BM

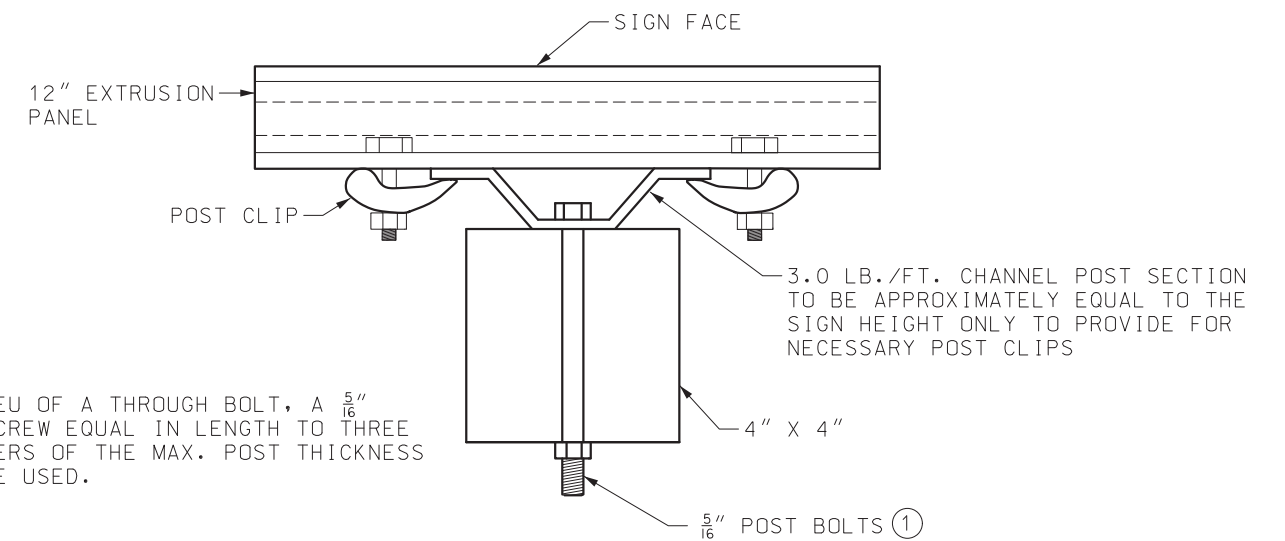
SHEET NO.
8 OF 16



WOOD POST DETAIL

4" X 4" WOOD POST - NO SLOTS OR HOLES REQUIRED
 4" X 6" WOOD POST - 1 1/2" X 1/2" SLOT ON 6" SIDE OR 1 1/2" DIA. HOLE ON 6" SIDE
 6" X 6" WOOD POST - 2" X 1/2" SLOT OR 2" DIA. HOLE
 SLOT ACROSS NEUTRAL AXIS FORMED BY SUCCESSIVE DRILLING WITH 1/2" BIT.

| NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO WOOD POST | |
|--|---------------------------------|
| SIGN HEIGHT | NO. OF BOLTS PER WOOD POST USED |
| 1' | 2 |
| 2' | 3 |
| 3' | 4 |
| 4' | 5 |
| 5' | 6 |
| 6' | 7 |
| 7' | 8 |



PLAN VIEW

MOUNTING DETAILS FOR EXTRUDED PANELS ON WOOD POST

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

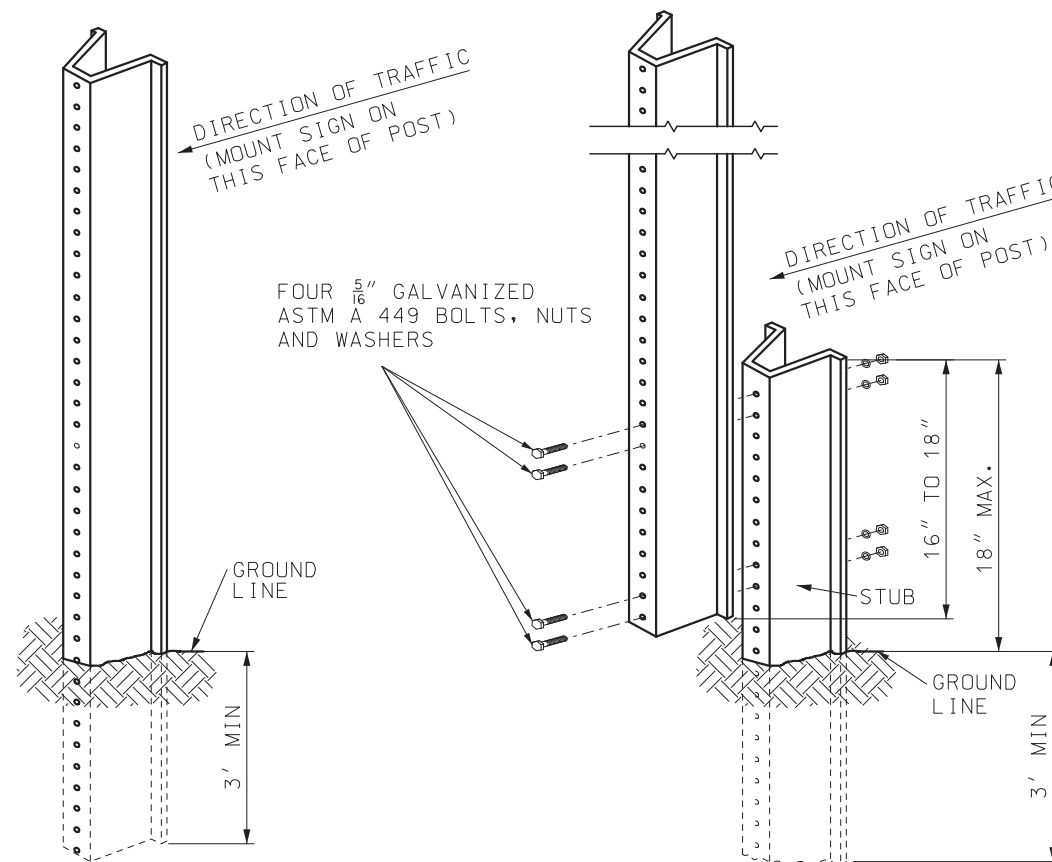
ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET INTO THE GROUND.

U-CHANNEL POST-STUB OVERLAP SHALL BE POSITIONED ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.

FOR POST SIZING SEE ENGINEERING POLICY GUIDE.

FOR POST CLIP DETAILS, SEE STANDARD PLANS 903.02 SHEET 4 OF 7.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 16.




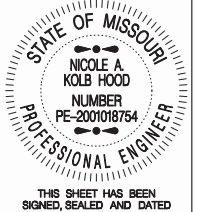
U-CHANNEL POST-STUB DETAIL

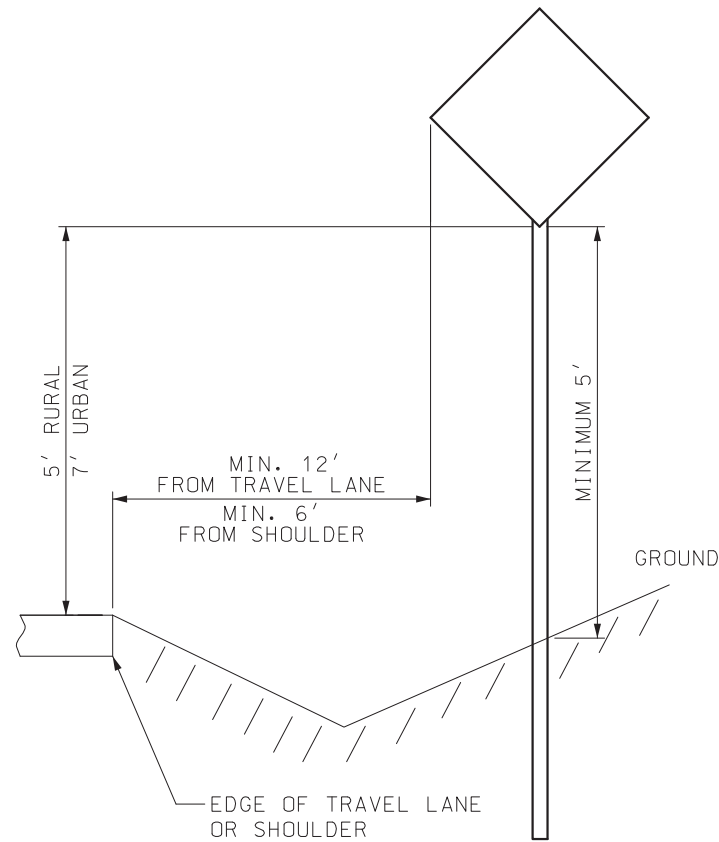
U-CHANNEL POST DETAIL OPTIONAL INSTALLATION

| SIGN AREA (SQ.FT.) | POST TYPE | |
|--------------------|------------------|-----------------------------|
| | U-CHANNEL | WOOD |
| ≤ 10 | 1 - 3.0 LB./FT.* | 1 - 4" X 4"* |
| > 10 ≤ 16 | 2 - 3.0 LB./FT. | 2 - 4" X 4" 1 - 4" X 6"* |
| > 16 ≤ 24 | 2 - 3.0 LB./FT. | 2 - 4" X 6" |
| > 24 ≤ 30 | 3 - 3.0 LB./FT. | 2 - 4" X 6" |
| > 30 ≤ 50 | N/A | 2 - 6" X 6" |

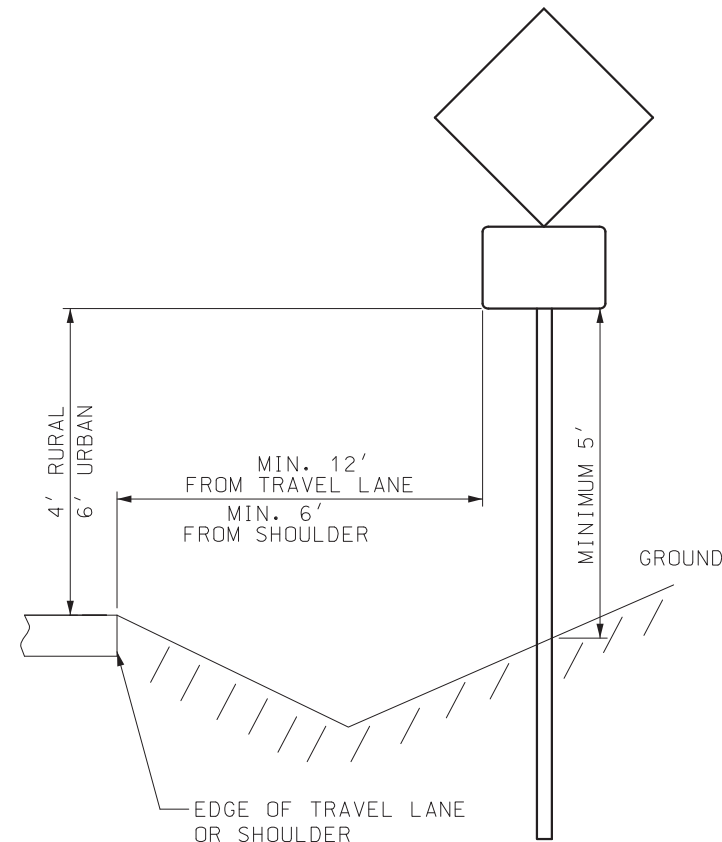
* SIGNS GREATER THAN 4 FEET IN WIDTH REQUIRE TWO POSTS, EXCEPT DIAMOND SHAPED WARNING SIGNS, YIELD SIGNS, AND ONE WAY SIGNS.

POST SIZE REQUIREMENTS

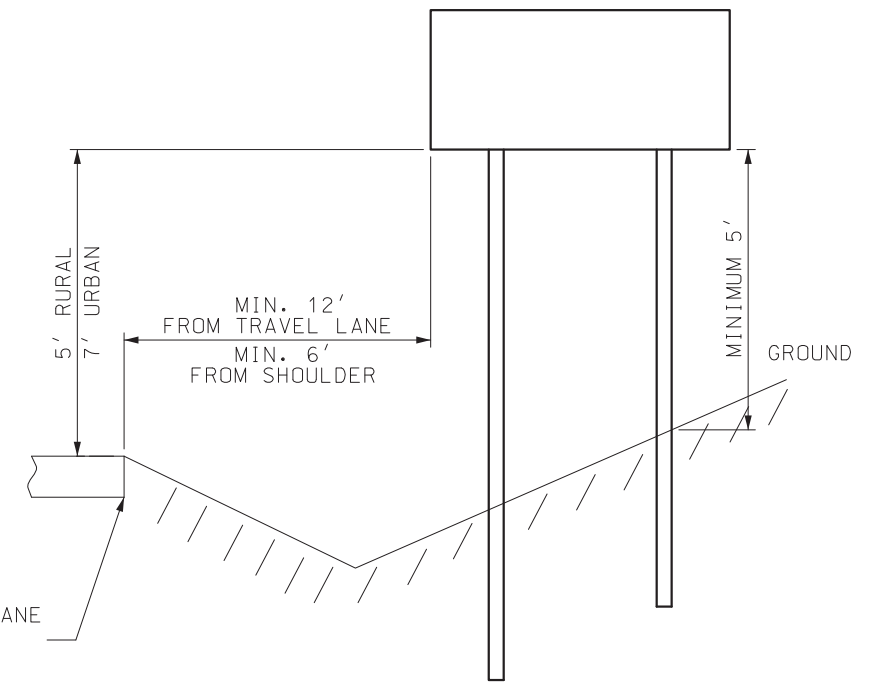
| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | SIGN MOUNTING DETAILS WOOD AND U-CHANNEL POST |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 903.03BM SHEET NO. 9 OF 16 |



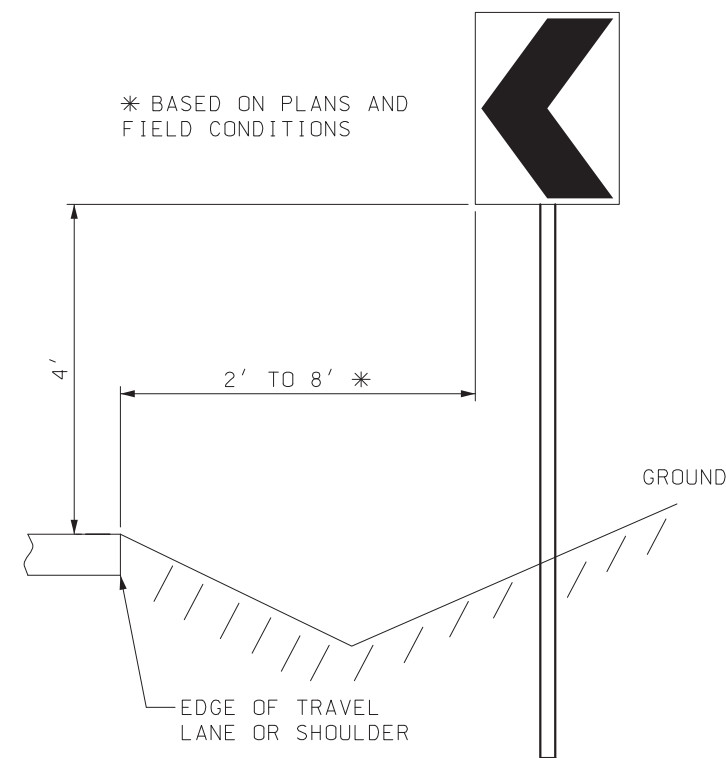
ONE POST – SINGLE SIGN



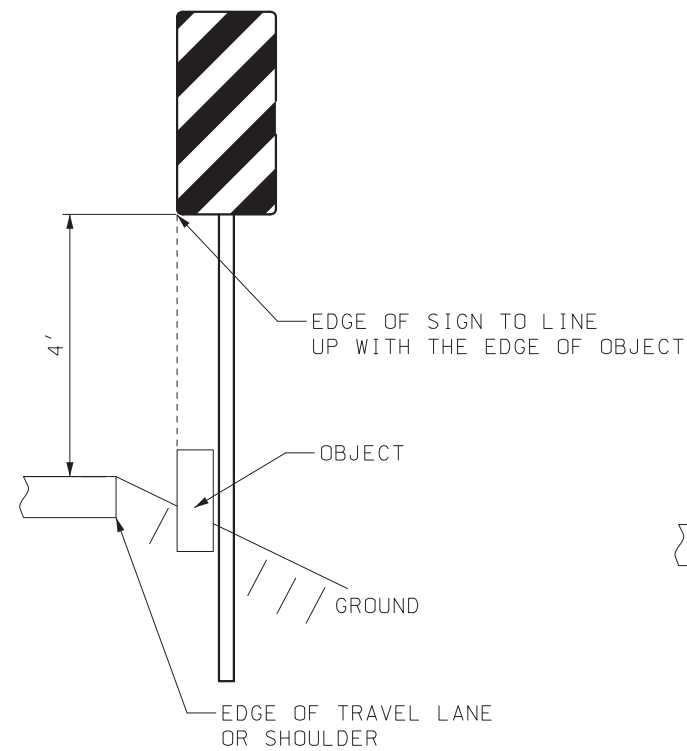
ONE POST – SINGLE SIGN WITH SUPPLEMENTAL PLAQUE



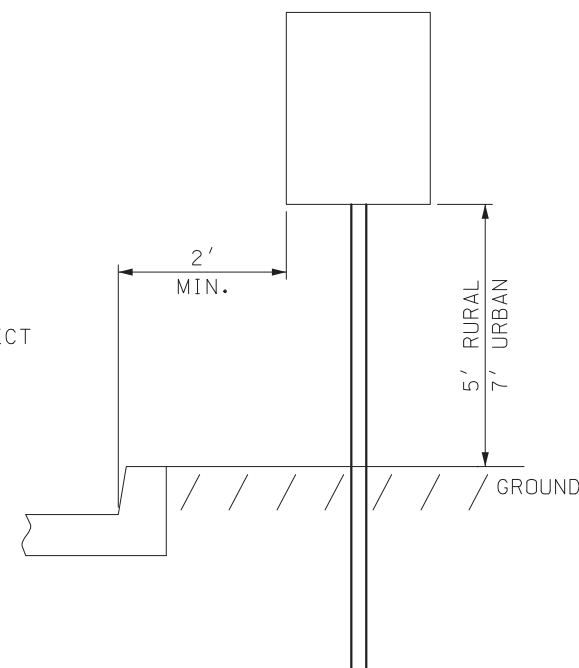
TWO POST



CHEVRON SIGN



TYPE III OBJECT MARKER



ADJACENT TO CURB


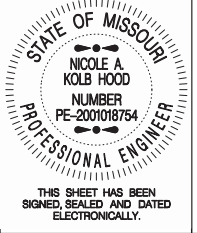
GENERAL NOTES:

SIGN MOUNTING BOLTS SHALL BE INSTALLED WITH A NYLON WASHER AGAINST THE SIGN FACE WITH A STEEL WASHER BETWEEN THE NYLON WASHER AND BOLT HEAD.

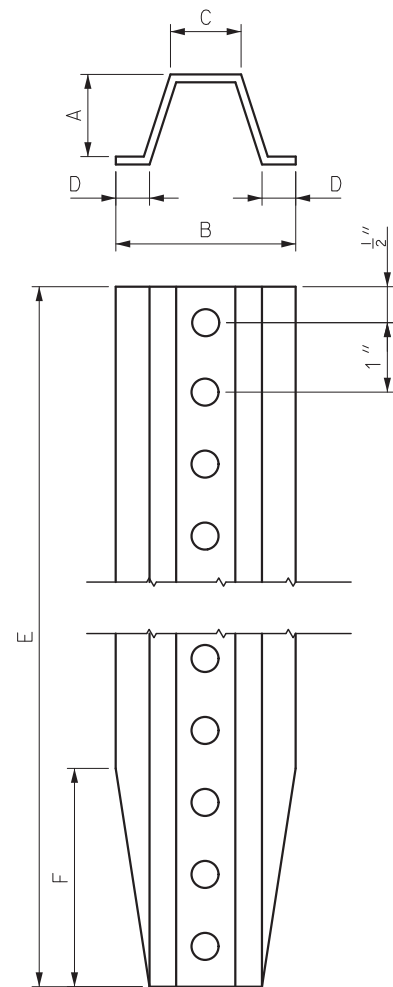
A LOCKNUT SHALL BE USED TO FASTEN THE SIGN TO THE POST.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 5' MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

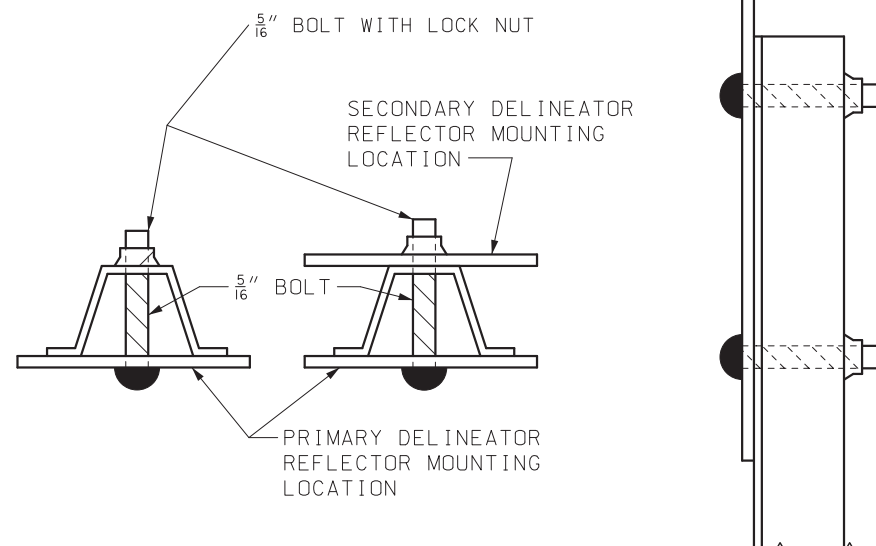
HORIZONTAL OFFSET MAY BE ADJUSTED BASED ON FIELD CONDITIONS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | SIGN MOUNTING DETAILS MOUNTING HEIGHT & OFFSET PIPE POSTS, PSST, WOOD & U-CHANNEL POSTS |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 903.03BM |
| SHEET NO. 10 OF 16 | |

MOUNTING HEIGHT DETAILS



GROUND MOUNT
U-CHANNEL



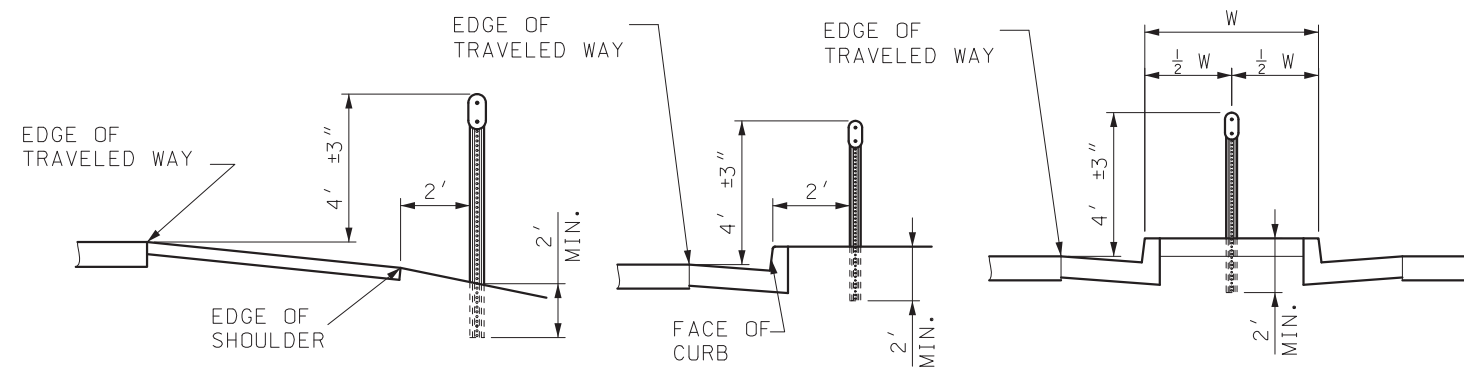
HOLE PUNCHING TO EQUAL $\frac{3}{8}$ " DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

| CHANNEL POST DELINEATOR | | | | | | | |
|-------------------------|---------------|---------------------|-----------------|-----------------|-----------------|-----|-----------------|
| LIMITS | LBS/FT (2) | DIMENSIONS - INCHES | | | | | |
| | | A | B | C | D | E | F |
| NOMINAL | 1.12 | 1 | $2\frac{1}{4}$ | $\frac{7}{8}$ | $\frac{3}{8}$ | 84 | 1 |
| TOLERANCE | ± 5% | ± $\frac{1}{8}$ | ± $\frac{1}{8}$ | ± $\frac{1}{8}$ | ± $\frac{1}{8}$ | ± 1 | ± $\frac{1}{4}$ |

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING.

THE CHANNEL POST FOR DELINEATORS SHALL BE MANUFACTURED FROM DUCTILE ASTM A 36 OR ASTM A 1011 GR 60.

CHANNEL POST DELINEATOR AND FASTENER DETAILS

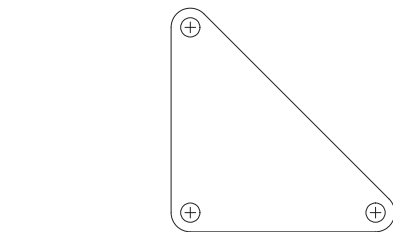


SHOULDER MOUNTED

OUTSIDE
BARRIER CURB

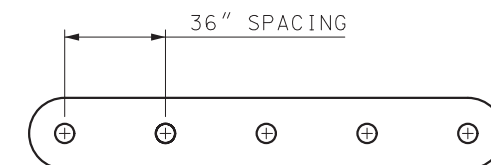
NARROW
PAVED MEDIAN

CHANNEL POST DELINEATOR MOUNTING DETAILS

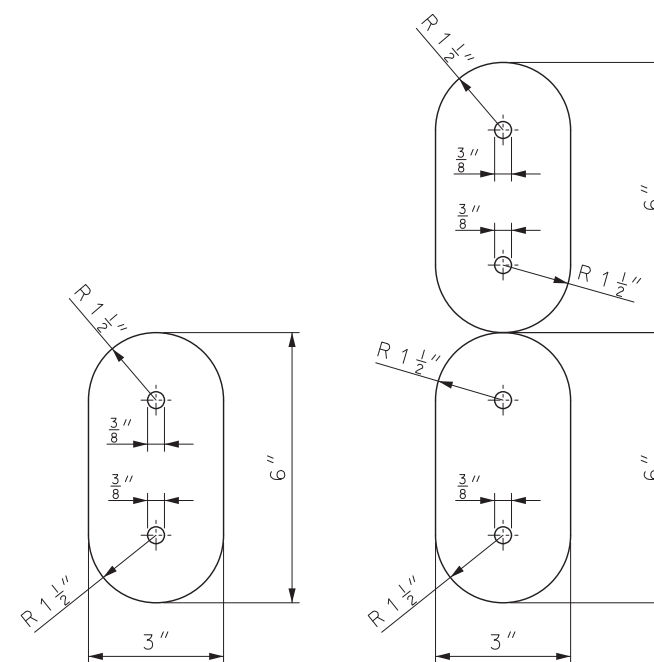


DELINEATOR PLACEMENT LOCATED
AT THE RADIUS POINTS

TUBULAR DELINEATOR PLACEMENT FOR ISLANDS



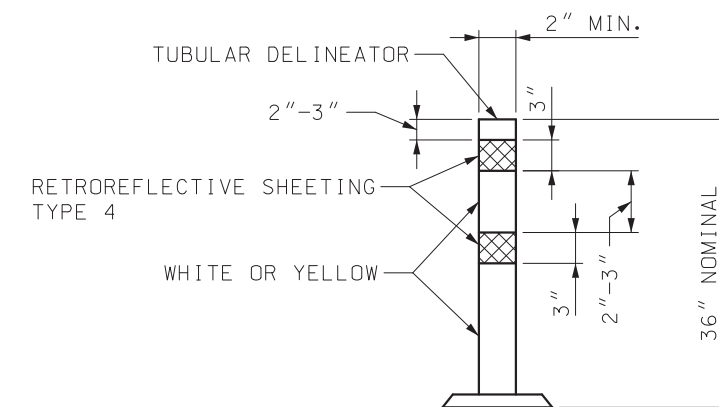
DELINEATOR PLACEMENT FOR MEDIAN STRIPS



SINGLE

DOUBLE STACKED

CHANNEL POST DELINEATOR REFLECTOR



36 INCH SURFACE-MOUNT DELINEATOR POST

TUBULAR DELINEATOR DETAIL

COLOR OF TUBULAR DELINEATOR AND REFLECTIVE SHEETING SHALL MATCH THE COLOR OF THE CLOSEST PAVEMENT MARKING OR CURB MARKING.

TUBULAR DELINEATOR SHAPE MAY BE ROUND OR T-SHAPED. TUBULAR DELINEATOR SHALL BE PERMANENTLY MOUNTED TO THE PAVEMENT SURFACE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

NOTES:

RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D4956 TYPE 9 OR 11 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7.5 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.

3" X 6" DELINEATOR BODY SHALL BE MADE FROM 0.080 INCH ALUMINUM.



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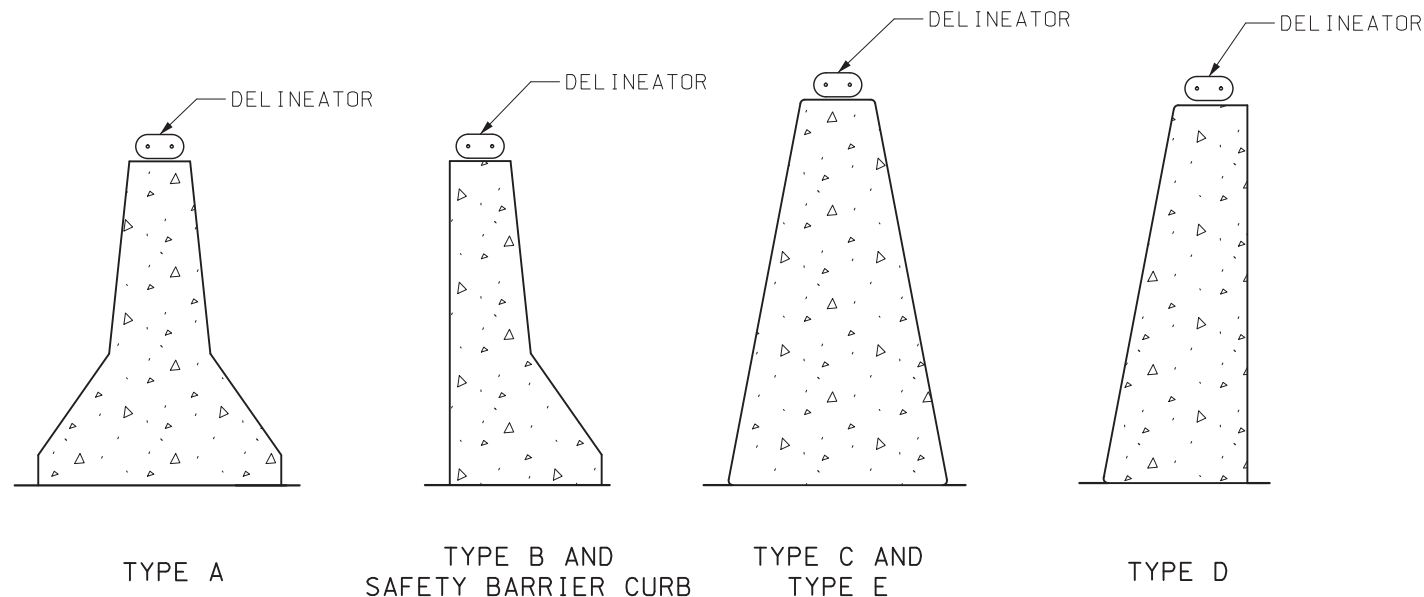
THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

SIGN MOUNTING DETAILS DELINEATORS

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

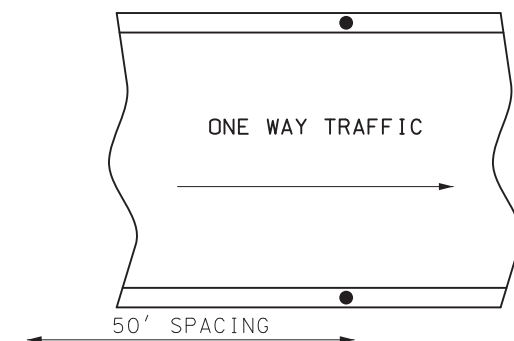
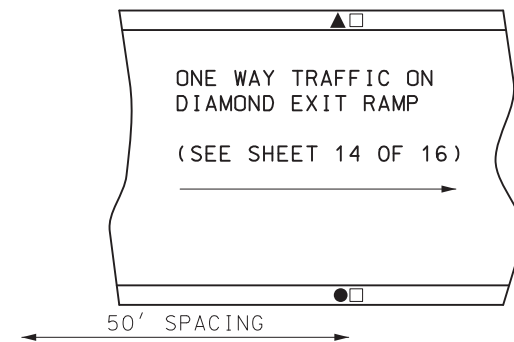
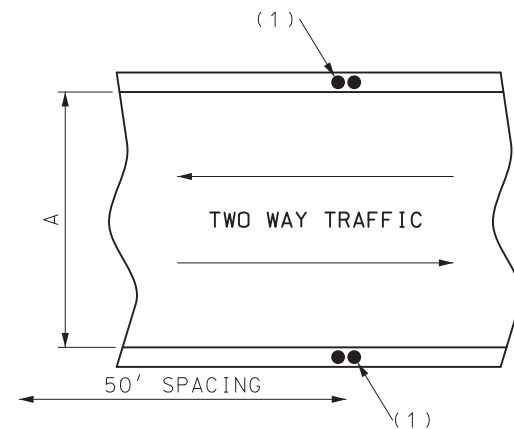
903.03BM

SHEET NO.
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DELINEATORS ON CONCRETE TRAFFIC BARRIER

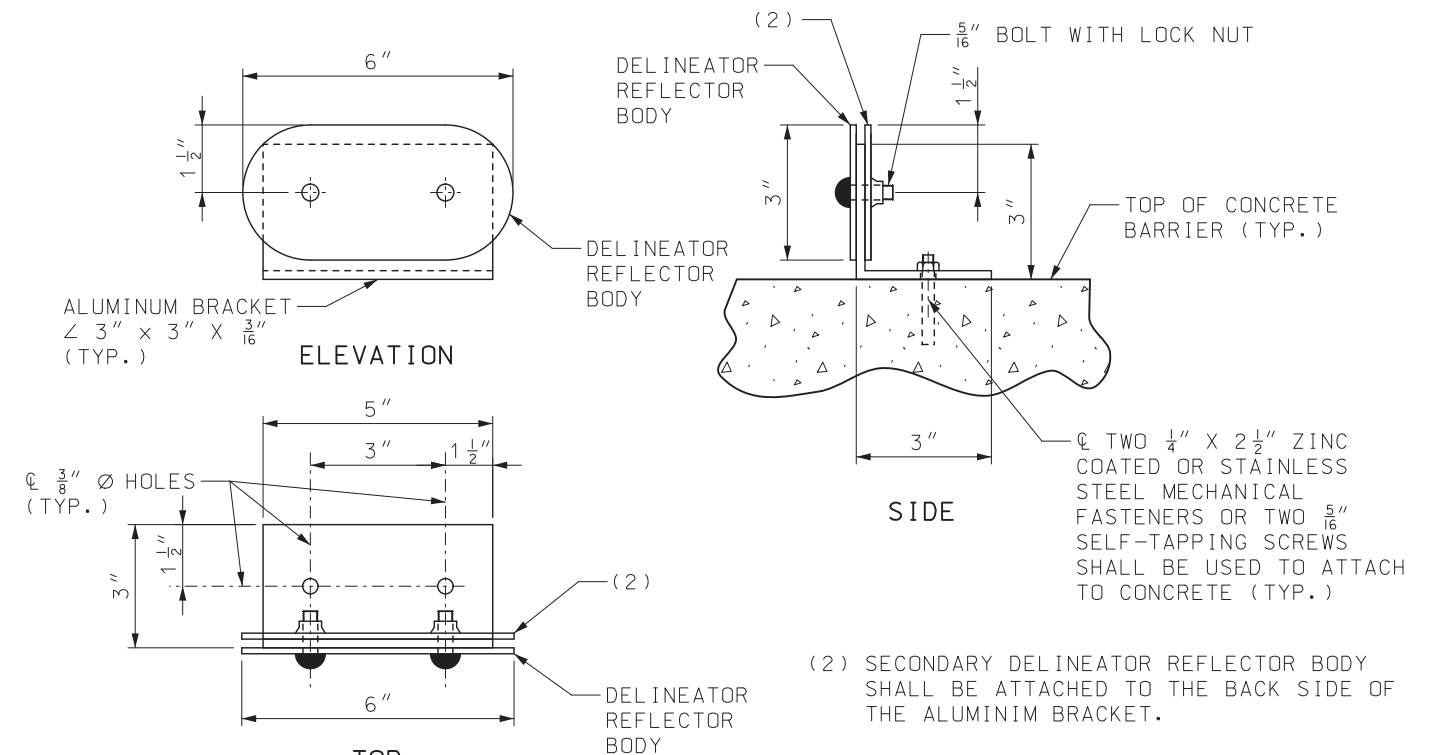
FOR CONCRETE BARRIER DETAILS,
SEE STD PLANS 617.10 OR BRIDGE PLANS.



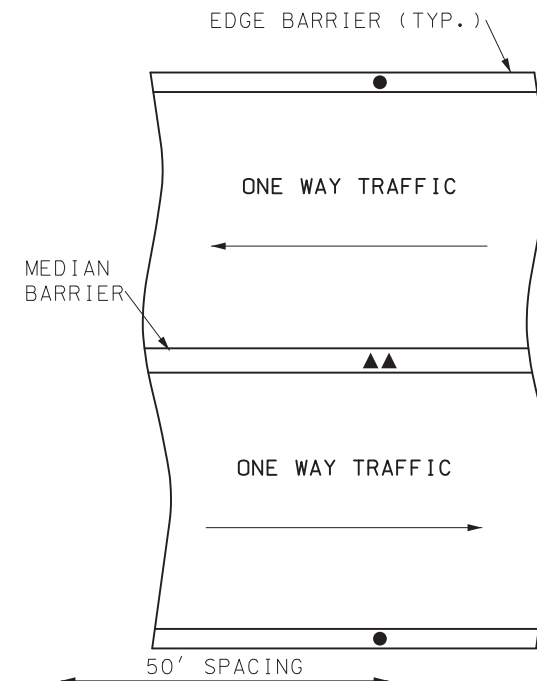
- LEGEND
- WHITE DELINEATOR
 - ▲ YELLOW DELINEATOR
 - RED DELINEATOR

(1) SECONDARY DELINEATOR ON BACK SIDE NOT REQUIRED IF ROADWAY "A" HAS MORE THAN 2 LANES

ROADWAY OR BRIDGE CONCRETE TRAFFIC BARRIER DELINEATION



DELINEATOR CONNECTION ON CONCRETE TRAFFIC BARRIER DETAIL



NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

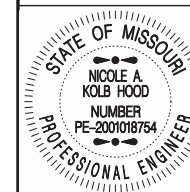
RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D 4956 TYPE 5 OR 8 SHALL BE APPLIED TO ONLY ONE SIDE OF THE DELINEATOR REFLECTOR BODY.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.



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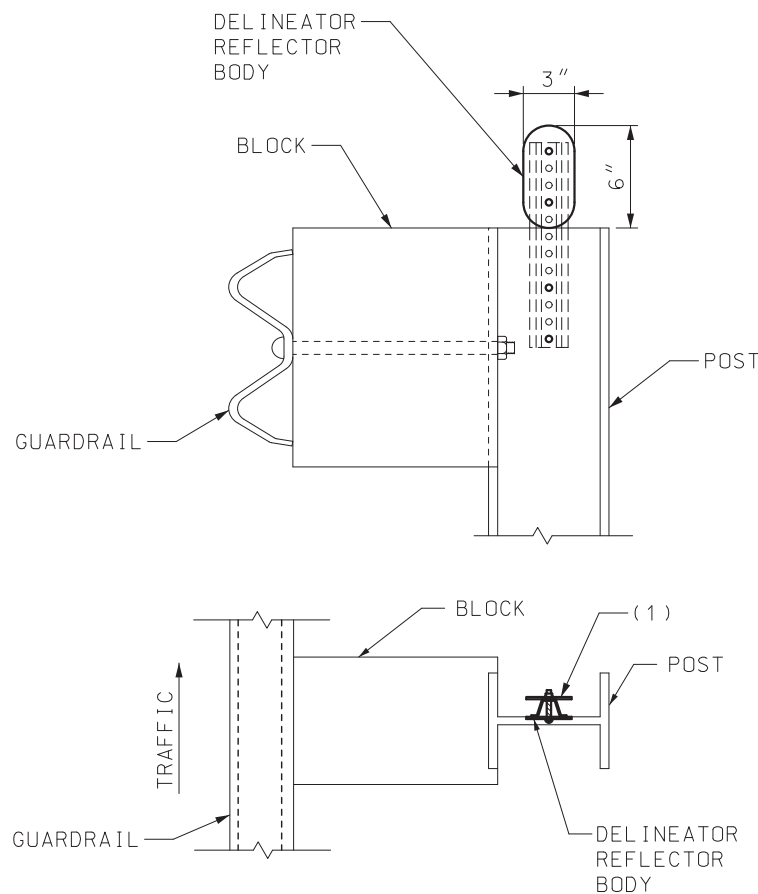
THIS SHEET HAS BEEN
SIGNED, SEALED, AND DATED
ELECTRONICALLY.

SIGN MOUNTING DETAILS CONCRETE BARRIER DELINEATORS

DATE EFFECTIVE: 10/01/2019
DATE PREPARED: 7/18/2019

903.03BM

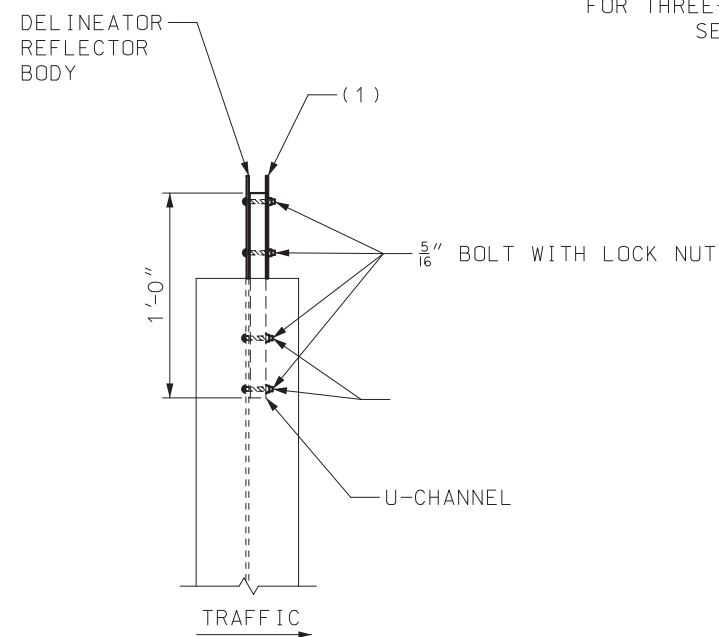
SHEET NO.
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DELINEATORS ON GUARDRAIL

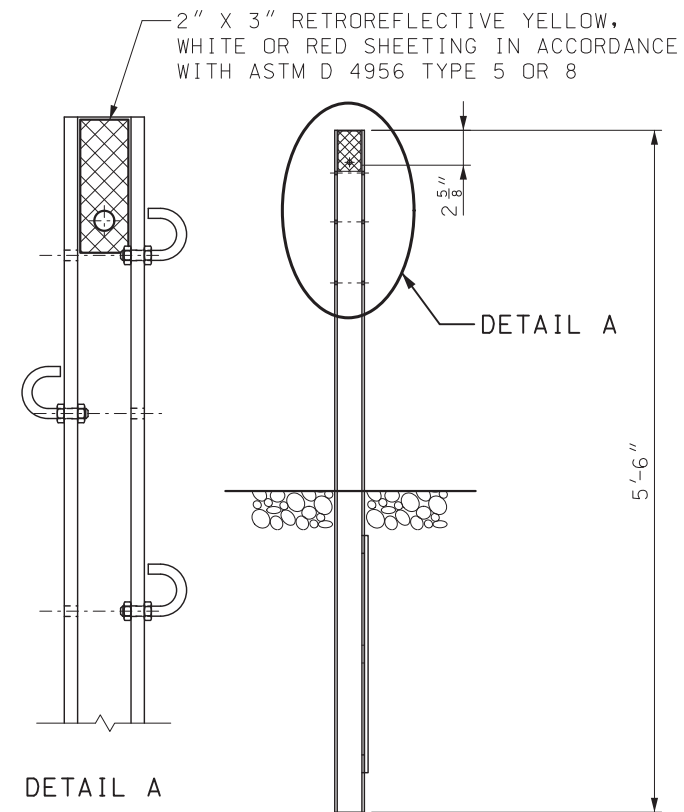
FOR GUARDRAIL DETAILS, SEE STD PLANS 606.00 AND 606.50.

(1) A SECONDARY DELINEATOR WITH RED SHEETING SHALL BE ATTACHED TO THE BACK SIDE OF THE CHANNEL WHEN THE DELINEATION IS PLACED ALONG AN INTERCHANGE RAMP AND COULD BE VIEWED BY WRONG WAY TRAFFIC.



DELINEATORS ON THREE-STRAND MEDIAN GUARD CABLE

FOR THREE-STRAND GUARD CABLE DETAILS
SEE STD PLANS 606.41.


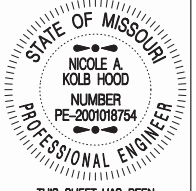


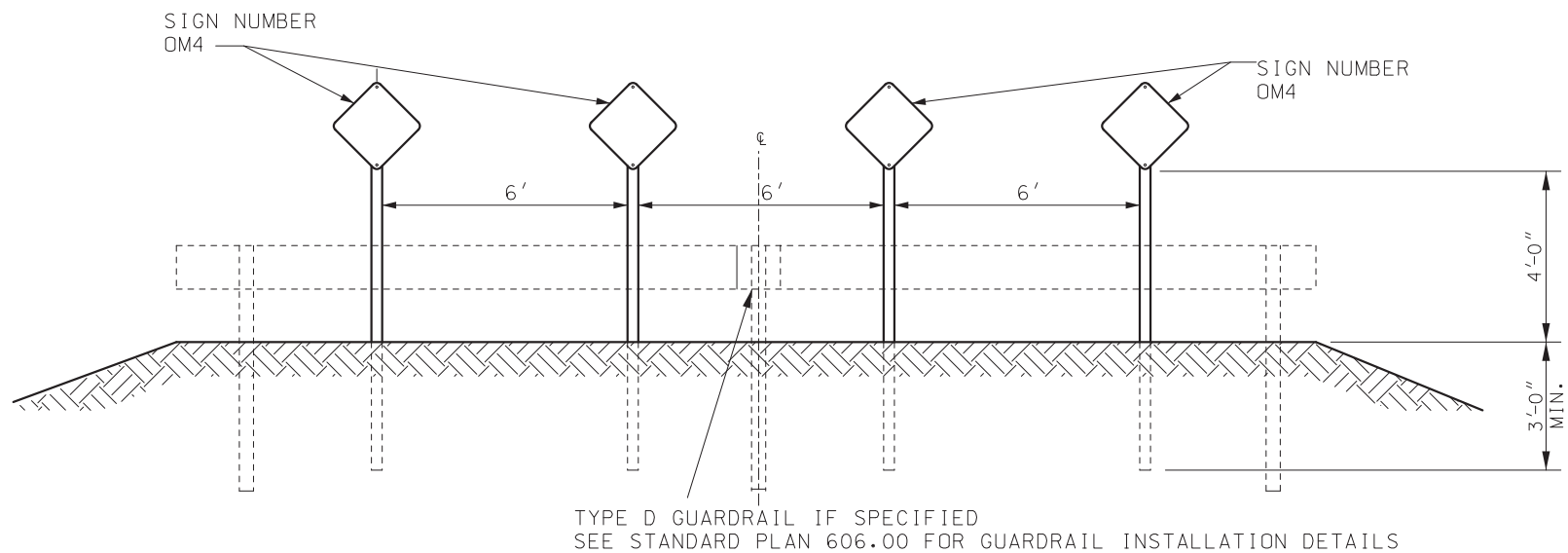
NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

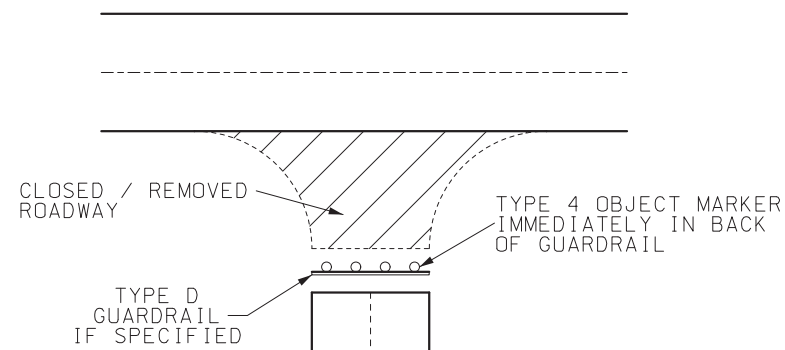
RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D 4956 TYPE 5 OR 8 SHALL BE APPLIED TO ONLY ONE SIDE OF THE CHANNEL POST DELINEATOR MOUNTED TOWARDS THE CHANNEL POST.

RETROREFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING.

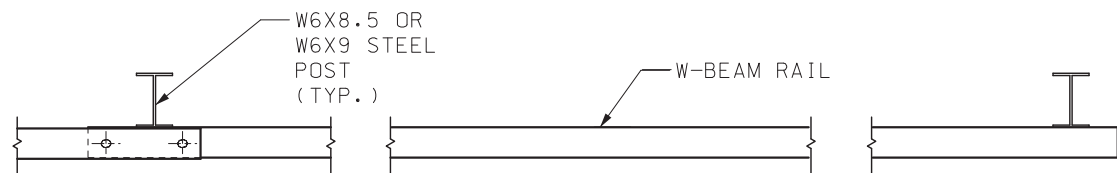
| | |
|--|---|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY.</p> | SIGN MOUNTING DETAILS GUARDRAIL AND GUARDCABLE DELINEATORS |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 903.03BM |
| SHEET NO. 13 OF 16 | |



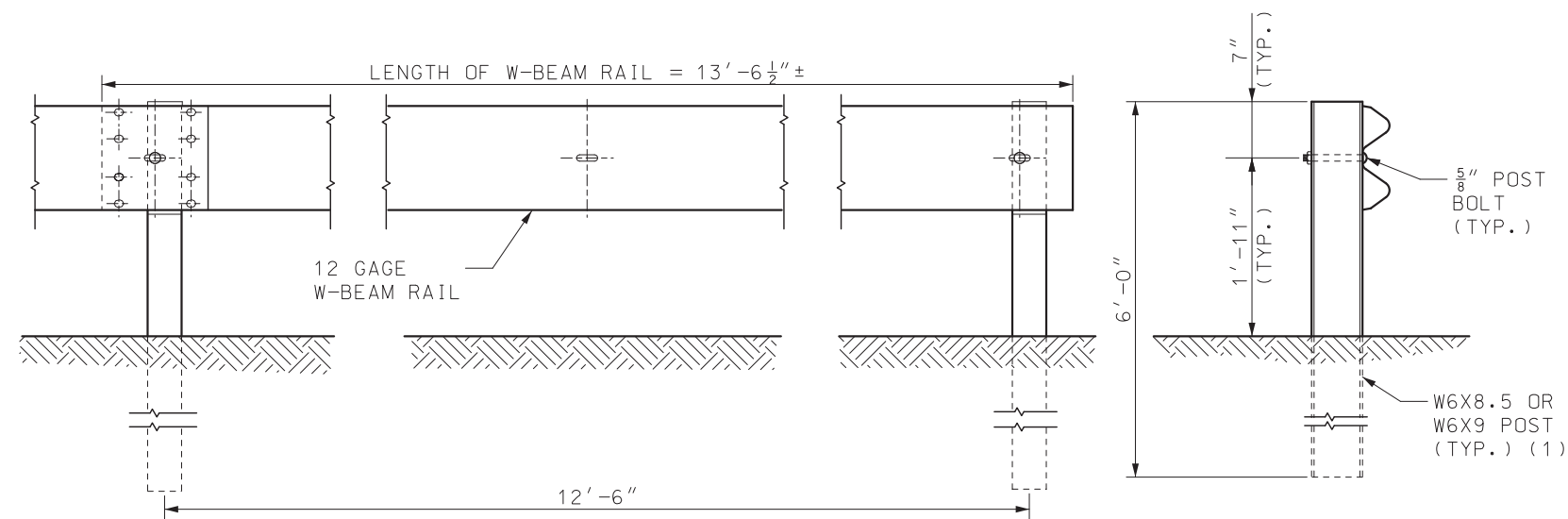
TYPE 4 OBJECT MARKER INSTALLATION



TYPICAL ROAD CLOSURE



PLAN

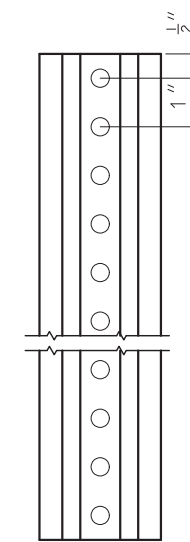


ELEVATION

STEEL POST

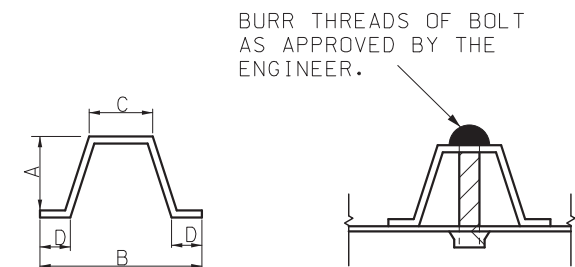
TYPE D GUARDRAIL

(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.



| STEEL OBJECT MARKER POST | | | | | |
|--------------------------|---------------|---------------------|-------|-------|-----|
| LIMITS | LBS/FT (2) | DIMENSIONS - INCHES | | | |
| | | A | B | C | D |
| MIN. | 2.40 | 1 1/4 | 2 1/2 | 1 | 1/2 |
| MAX. | 2.80 | 1 5/8 | 3 1/4 | 1 3/8 | 3/4 |

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING. LIMITS SHOWN ARE ABSOLUTE. NO FURTHER WEIGHT, DIMENSIONAL OR COMMERCIAL TOLERANCE WILL BE ACCEPTABLE.




HOLE PUNCHING TO EQUAL 3/8" DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

OBJECT MARKER POST AND FASTENER DETAILS

NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 16.

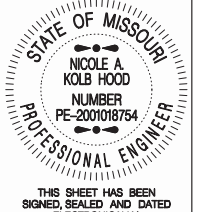
TYPE D GUARDRAIL IS ACCESS RESTRAINT AND VISUAL TARGET VALUE ONLY. IT HAS NO REDIRECTIVE CAPABILITY.



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**SIGN MOUNTING DETAILS
OBJECT MARKERS FOR
ROAD CLOSURE**



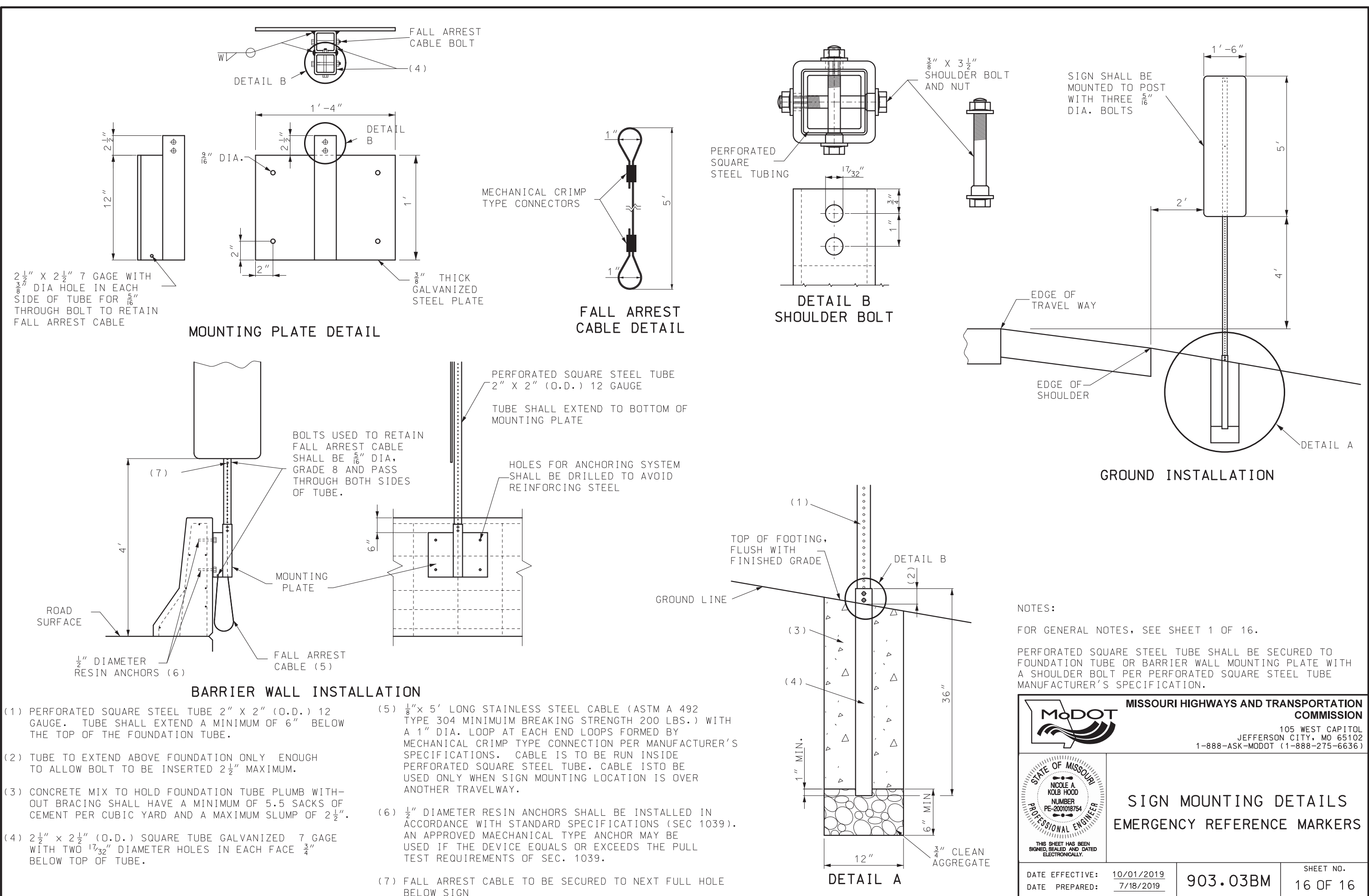
THIS SHEET HAS BEEN
SIGNED, SEALED, AND DATED
ELECTRONICALLY.

903.03BM

SHEET NO.
15 OF 16

DATE EFFECTIVE: 10/01/2019

DATE PREPARED: 7/18/2019



2 1/2" X 2 1/2" 7 GAGE WITH 1/16" DIA HOLE IN EACH SIDE OF TUBE FOR 5/16" THROUGH BOLT TO RETAIN FALL ARREST CABLE

MOUNTING PLATE DETAIL

FALL ARREST CABLE DETAIL

DETAIL B SHOULDER BOLT



GROUND INSTALLATION

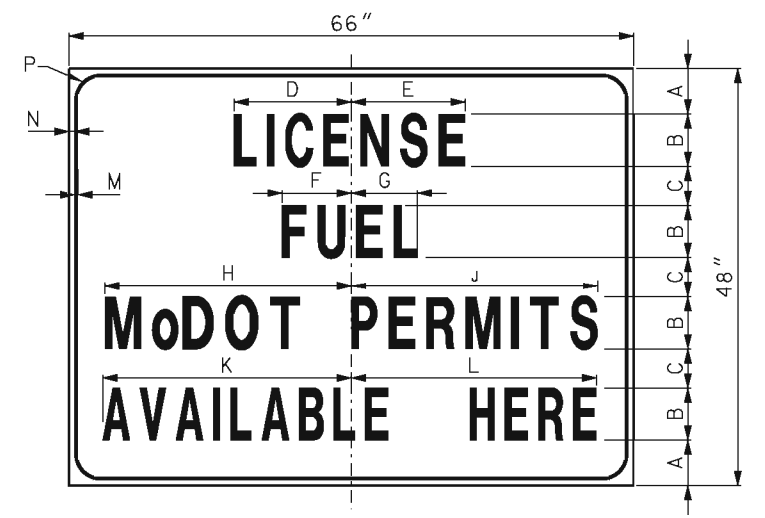
BARRIER WALL INSTALLATION

- (1) PERFORATED SQUARE STEEL TUBE 2" X 2" (O.D.) 12 GAUGE. TUBE SHALL EXTEND A MINIMUM OF 6" BELOW THE TOP OF THE FOUNDATION TUBE.
- (2) TUBE TO EXTEND ABOVE FOUNDATION ONLY ENOUGH TO ALLOW BOLT TO BE INSERTED 2 1/2" MAXIMUM.
- (3) CONCRETE MIX TO HOLD FOUNDATION TUBE PLUMB WITHOUT BRACING SHALL HAVE A MINIMUM OF 5.5 SACKS OF CEMENT PER CUBIC YARD AND A MAXIMUM SLUMP OF 2 1/2".
- (4) 2 1/2" X 2 1/2" (O.D.) SQUARE TUBE GALVANIZED 7 GAGE WITH TWO 17/32" DIAMETER HOLES IN EACH FACE 3/4" BELOW TOP OF TUBE.
- (5) 1/8" X 5' LONG STAINLESS STEEL CABLE (ASTM A 492 TYPE 304 MINIMUM BREAKING STRENGTH 200 LBS.) WITH A 1" DIA. LOOP AT EACH END FORMED BY MECHANICAL CRIMP TYPE CONNECTION PER MANUFACTURER'S SPECIFICATIONS. CABLE IS TO BE RUN INSIDE PERFORATED SQUARE STEEL TUBE. CABLE IS TO BE USED ONLY WHEN SIGN MOUNTING LOCATION IS OVER ANOTHER TRAVELWAY.
- (6) 1/2" DIAMETER RESIN ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATIONS (SEC 1039). AN APPROVED MAECHANICAL TYPE ANCHOR MAY BE USED IF THE DEVICE EQUALS OR EXCEEDS THE PULL TEST REQUIREMENTS OF SEC. 1039.
- (7) FALL ARREST CABLE TO BE SECURED TO NEXT FULL HOLE BELOW SIGN

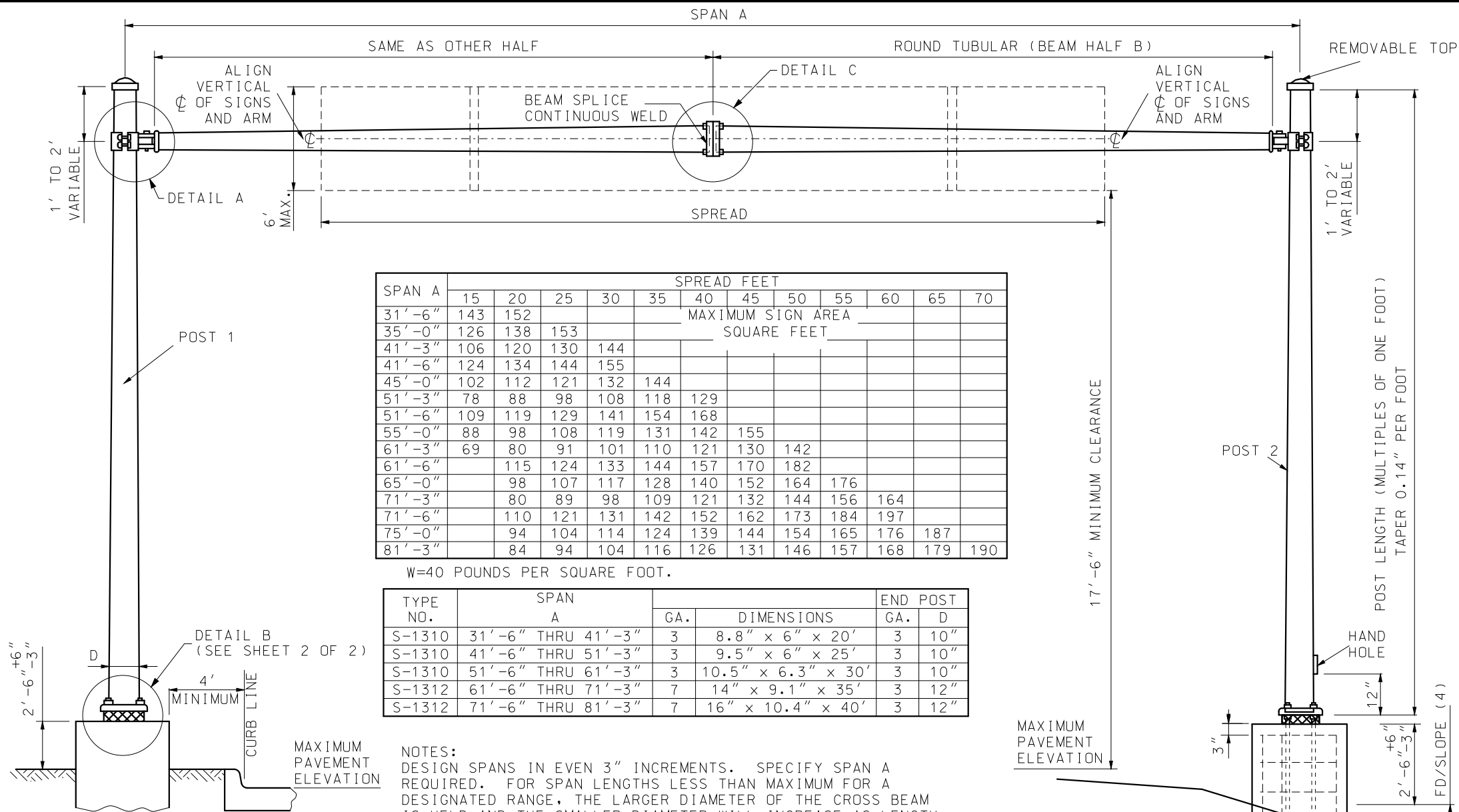
NOTES:
FOR GENERAL NOTES, SEE SHEET 1 OF 16.

PERFORATED SQUARE STEEL TUBE SHALL BE SECURED TO FOUNDATION TUBE OR BARRIER WALL MOUNTING PLATE WITH A SHOULDER BOLT PER PERFORATED SQUARE STEEL TUBE MANUFACTURER'S SPECIFICATION.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  STATE OF MISSOURI NICOLE A. KOLB HOOD NUMBER PE-2001018754 PROFESSIONAL ENGINEER THIS SHEET HAS BEEN SIGNED, SEALED, AND DATED ELECTRONICALLY. | SIGN MOUNTING DETAILS EMERGENCY REFERENCE MARKERS |
| DATE EFFECTIVE: 10/01/2019 DATE PREPARED: 7/18/2019 | 903.03BM |
| SHEET NO. 16 OF 16 | |



| | | | |
|---|---|--|--|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <h1 style="text-align: center;">HIGHWAY SIGNING</h1> <h2 style="text-align: center;">WEIGH STATION</h2> | | |
| DATE EFFECTIVE: <u>02/01/2012</u> DATE PREPARED: <u>12/19/2011</u> | <h1 style="font-size: 2em;">903.04F</h1> | | SHEET NO. <div style="font-size: 2em; text-align: center;">1 OF 1</div> |



| SPAN A | SPREAD FEET | | | | | | | | | | | |
|--------|-------------|-----|-----|-----|-----|-------------------|-----|-----|-----|-----|-----|-----|
| | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| 31'-6" | 143 | 152 | | | | MAXIMUM SIGN AREA | | | | | | |
| 35'-0" | 126 | 138 | 153 | | | SQUARE FEET | | | | | | |
| 41'-3" | 106 | 120 | 130 | 144 | | | | | | | | |
| 41'-6" | 124 | 134 | 144 | 155 | | | | | | | | |
| 45'-0" | 102 | 112 | 121 | 132 | 144 | | | | | | | |
| 51'-3" | 78 | 88 | 98 | 108 | 118 | 129 | | | | | | |
| 51'-6" | 109 | 119 | 129 | 141 | 154 | 168 | | | | | | |
| 55'-0" | 88 | 98 | 108 | 119 | 131 | 142 | 155 | | | | | |
| 61'-3" | 69 | 80 | 91 | 101 | 110 | 121 | 130 | 142 | | | | |
| 61'-6" | | 115 | 124 | 133 | 144 | 157 | 170 | 182 | | | | |
| 65'-0" | | 98 | 107 | 117 | 128 | 140 | 152 | 164 | 176 | | | |
| 71'-3" | | 80 | 89 | 98 | 109 | 121 | 132 | 144 | 156 | 164 | | |
| 71'-6" | | 110 | 121 | 131 | 142 | 152 | 162 | 173 | 184 | 197 | | |
| 75'-0" | | 94 | 104 | 114 | 124 | 139 | 144 | 154 | 165 | 176 | 187 | |
| 81'-3" | | 84 | 94 | 104 | 116 | 126 | 131 | 146 | 157 | 168 | 179 | 190 |

W=40 POUNDS PER SQUARE FOOT.

| TYPE NO. | SPAN A | GA. | | DIMENSIONS | END POST | |
|----------|--------------------|-----|--|--------------------|----------|-----|
| | | | | | GA. | D |
| S-1310 | 31'-6" THRU 41'-3" | 3 | | 8.8" x 6" x 20' | 3 | 10" |
| S-1310 | 41'-6" THRU 51'-3" | 3 | | 9.5" x 6" x 25' | 3 | 10" |
| S-1310 | 51'-6" THRU 61'-3" | 3 | | 10.5" x 6.3" x 30' | 3 | 10" |
| S-1312 | 61'-6" THRU 71'-3" | 7 | | 14" x 9.1" x 35' | 3 | 12" |
| S-1312 | 71'-6" THRU 81'-3" | 7 | | 16" x 10.4" x 40' | 3 | 12" |

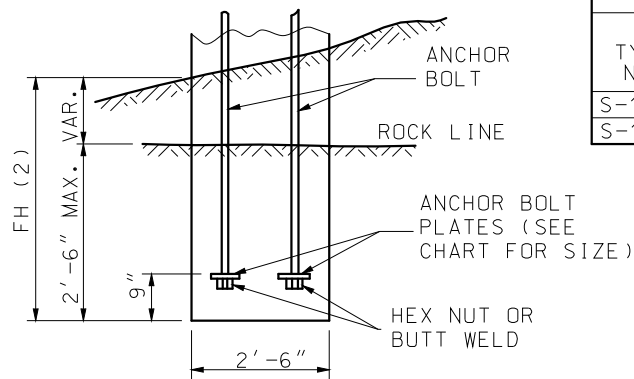
NOTES:
DESIGN SPANS IN EVEN 3" INCREMENTS. SPECIFY SPAN A REQUIRED. FOR SPAN LENGTHS LESS THAN MAXIMUM FOR A DESIGNATED RANGE, THE LARGER DIAMETER OF THE CROSS BEAM IS HELD AND THE SMALLER DIAMETER WILL INCREASE AS LENGTH IS REDUCED. DESIGN POSTS IN EVEN 1" INCREMENTS.

| TYPE NO. | DIA. FD | ESTIMATED QUANTITIES FOOTING | | | | | |
|----------|---------|------------------------------|----------|-------------------|--------|-------|-------|
| | | CLASS B CONCRETE | | REINFORCING STEEL | | | |
| | | 1' DEPTH | 1" DEPTH | #5 | #4 (3) | TOTAL | |
| S-1310 | 2'-6" | 0.1818 | 0.01515 | 6 | 8'-9" | 10 | 7'-2" |
| S-1312 | 2'-6" | 0.1818 | 0.01515 | 6 | 10'-3" | 12 | 7'-2" |

(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 1V:2H SLOPE.

| MODIFIED FOOTING IN SOLID ROCK | | |
|--------------------------------|-----------------|------------------------|
| TYPE NO. | ANCHOR BOLT (1) | ANCHOR BOLT PLATE |
| S-1310 | 1 1/2" DIA. | 3 1/2" x 3 1/2" x 3/4" |
| S-1312 | 1 3/4" DIA. | 3 1/2" x 3 1/2" x 3/4" |

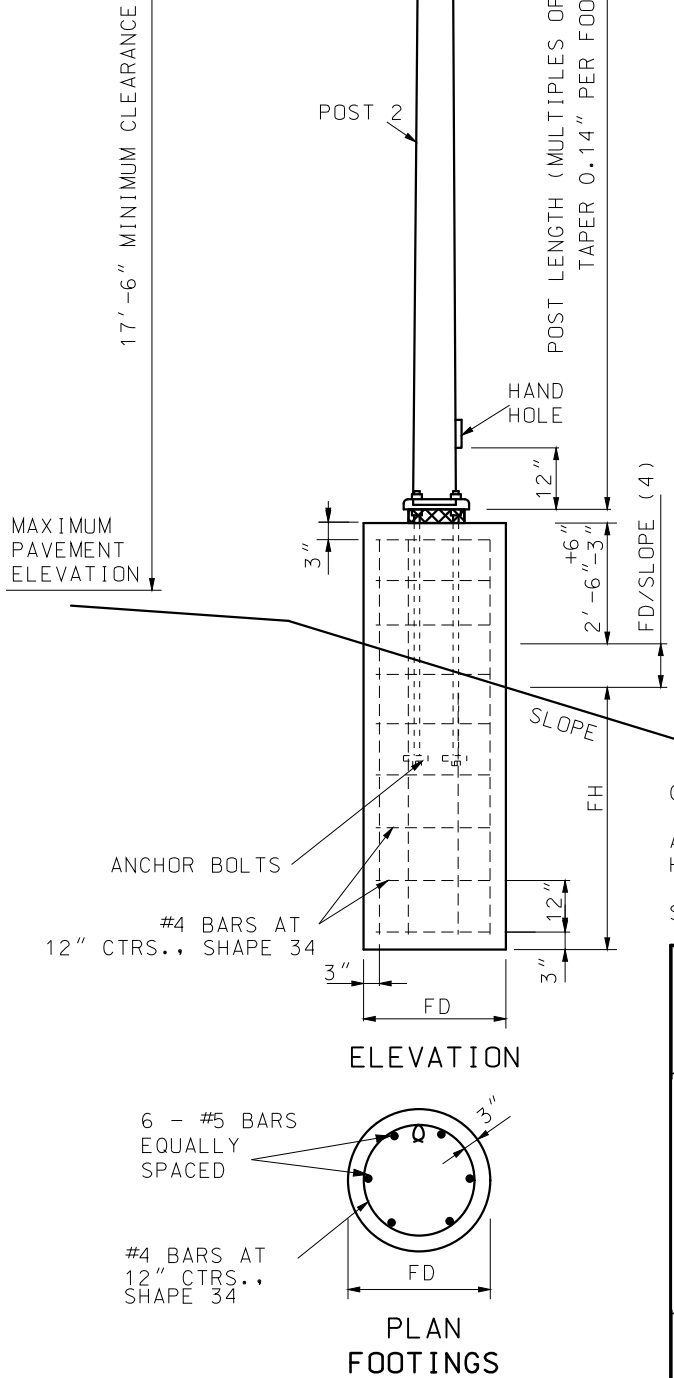
(1) ANCHOR BOLT LENGTH AS REQUIRED



REINFORCEMENT PLACED SAME AS STANDARD FOOTING. CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK.

MODIFIED FOOTING IN SOLID ROCK

(2) NOT TO EXCEED 5' FOR S-1310, NOT TO EXCEED 6'-6" FOR S-1312.



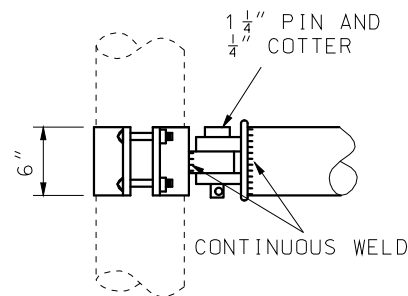
(4) EXAMPLE: IF SLOPE IS 1V:6H, THE DENOMINATOR IS 6

GENERAL NOTES:

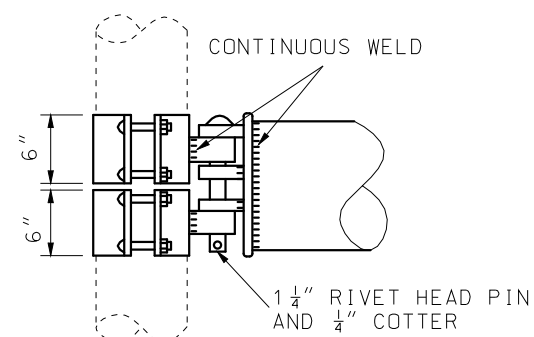
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE ARM.

SEE SHEET 2 OF 2 FOR DETAILS A, B AND C.

| | |
|--|---|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| <p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>HIGHWAY SIGNING</p> <p>TUBULAR SUPPORT STEEL</p> <p>TYPE S</p> <p>ONE TUBE</p> |
| <p>DATE EFFECTIVE: 10/01/2016</p> <p>DATE PREPARED: 8/11/2016</p> | <p>903.05J</p> |
| <p>SHEET NO. 1 OF 2</p> | |

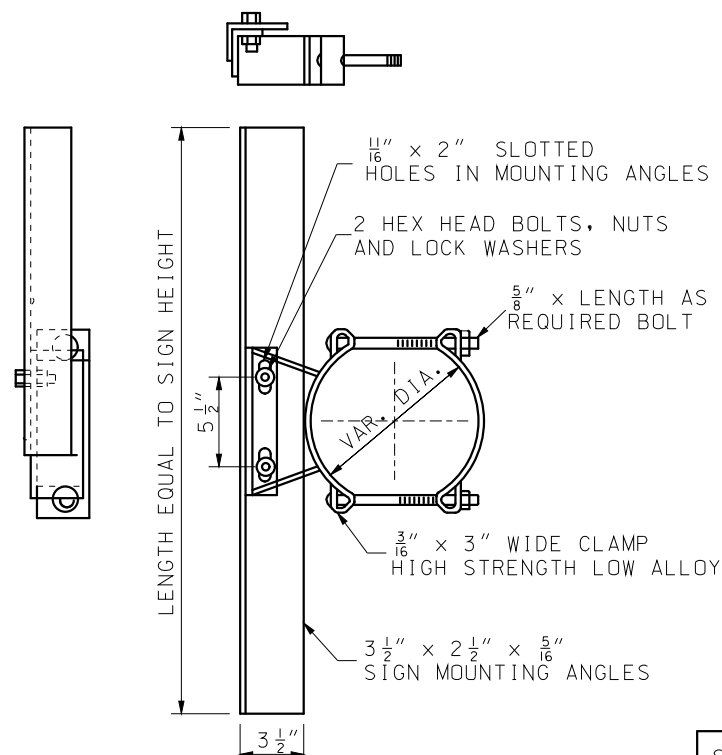


TUBE DIAMETER EQUAL TO
OR LESS THAN 10 1/2"
AT CENTER OF SPAN



TUBE DIAMETER GREATER THAN 10 1/2"
AT CENTER OF SPAN

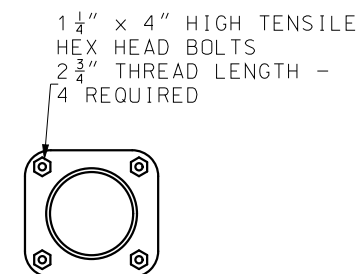
DETAIL A
BEAM CLAMP



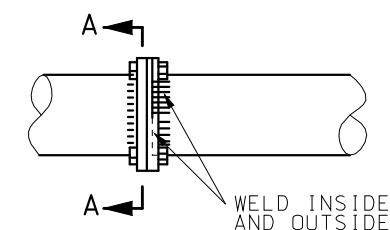
NOTE:
MINIMUM OF TWO BRACKETS ARE REQUIRED
FOR SIGNS OVER 42" IN LENGTH.

GALVANIZED SIGN
BRACKET ASSEMBLY

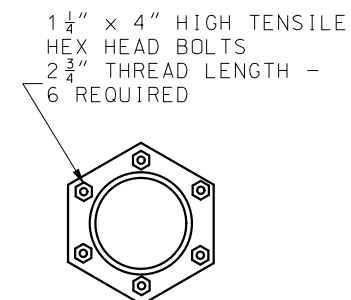
| SIGN HEIGHT (INCHES) | MAXIMUM LIN. FT. OF SIGN WIDTH PER BRACKET |
|-------------------------|--|
| 48 & UNDER | 13 |
| 60 | 8 |
| 72 | 5 |



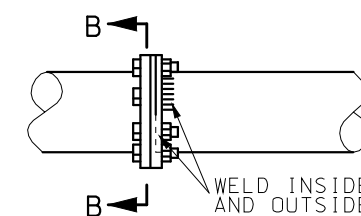
SECTION A-A



TUBE DIAMETER 9 1/2"
AND UNDER



SECTION B-B

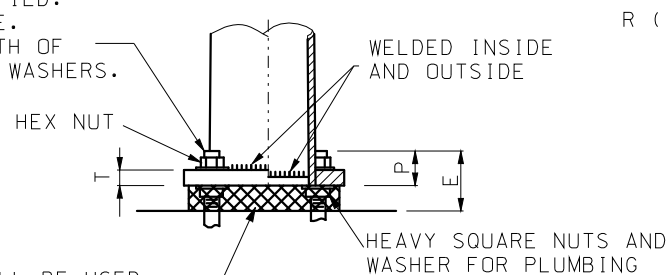


TUBE DIAMETER
OVER 9 1/2"

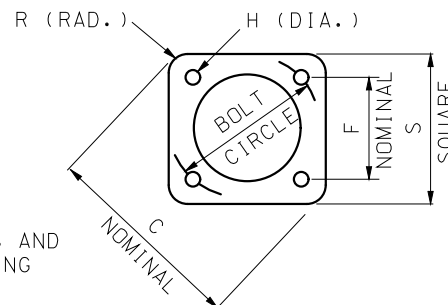
DETAIL C
BEAM SPLICE

| POST BASE DIMENSIONS AND DATA | | | | | | | | | | | | |
|-------------------------------|-------------|---------|----------|--------|---------|--------|--------|--------|--------|--------------|---------|-------|
| TYPE NO. | BOLT CIRCLE | C | F | H | S | R | P | T | E | ANCHOR BOLT | FOOTING | |
| | | | | | | | | | | | FH | FD |
| S-1310 | 13 1/2" | 17 1/2" | 9 9/16" | 1 3/4" | 14 1/8" | 3 1/8" | 3 3/4" | 1 1/2" | 7" | 1 1/2" x 60" | 5'-0" | 2'-6" |
| S-1312 | 16" | 21" | 11 5/16" | 2 1/8" | 17" | 3 3/4" | 4 1/2" | 2" | 7 1/2" | 1 3/4" x 90" | 6'-6" | 2'-6" |

ANCHOR BOLTS AS SPECIFIED.
THREAD UPPER PORTION E.
GALVANIZE ENTIRE LENGTH OF
BOLT AND ALL NUTS AND WASHERS.




ELEVATION



PLAN

DETAIL B
POST BASE

A GALVANIZED SCREEN SHALL BE USED
BETWEEN THE POST BASE PLATE AND
CONCRETE BASE. SCREENS SHALL BE
PRESS-FORMED OF 3 OR 4 MESH, 21 GAGE
OR HEAVIER. STAINLESS STEEL OR
HOT-DIPPED GALVANIZED WIRE SCREEN
OR APPROVED EQUIVALENT. THAT WILL
PROVIDE A FRICTION-TIGHT FIT WHEN
INSTALLED.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION


105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

HIGHWAY SIGNING

TUBULAR SUPPORT STEEL

TYPE S

ONE TUBE



THIS SHEET HAS BEEN
SIGNED, SEALED AND DATED
ELECTRONICALLY.

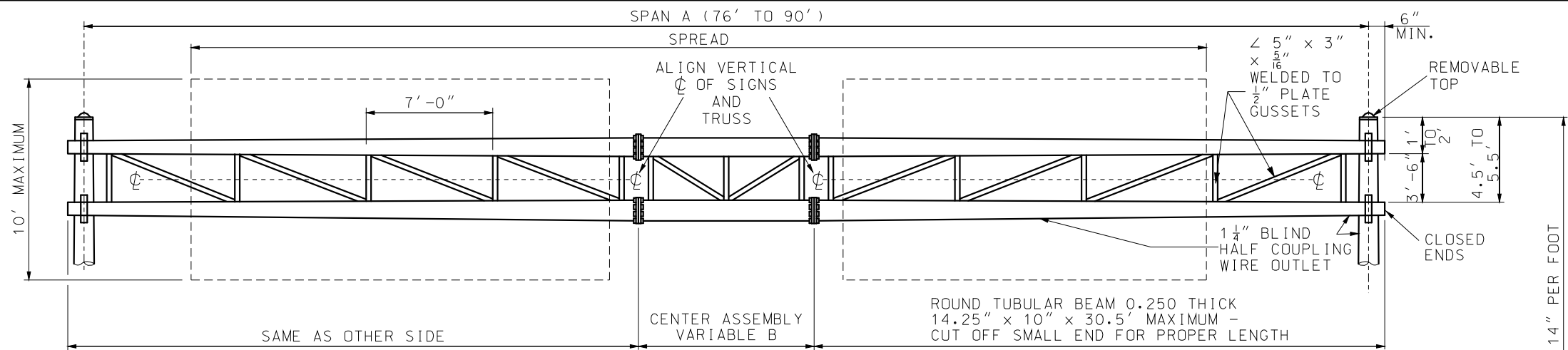
DATE EFFECTIVE: 10/01/2016

DATE PREPARED: 8/11/2016

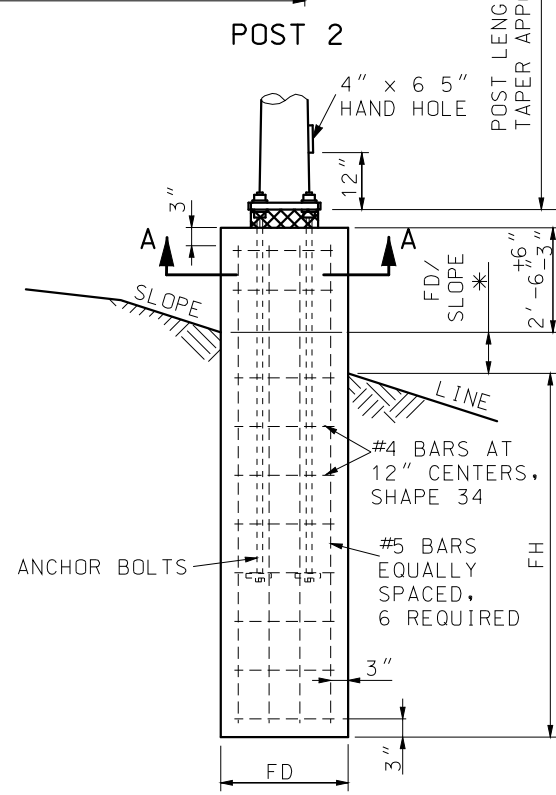
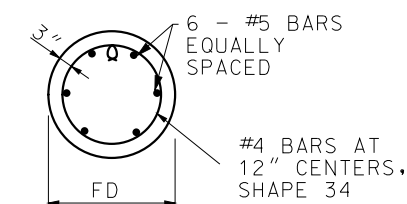
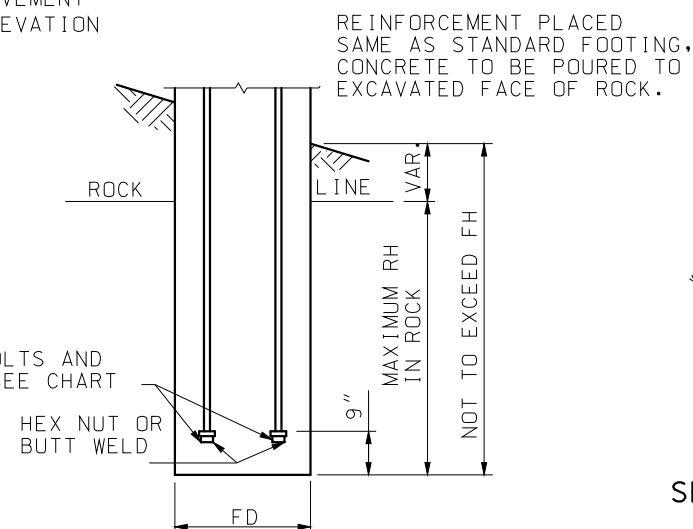
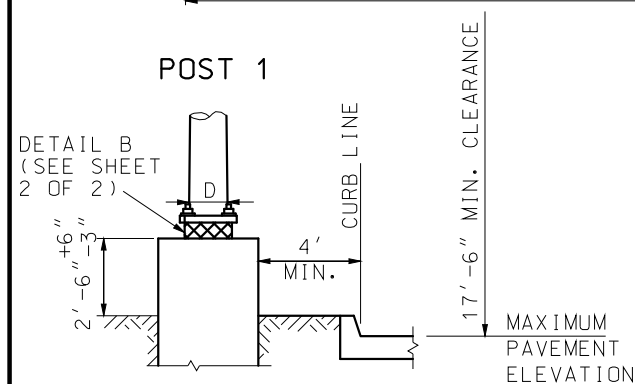
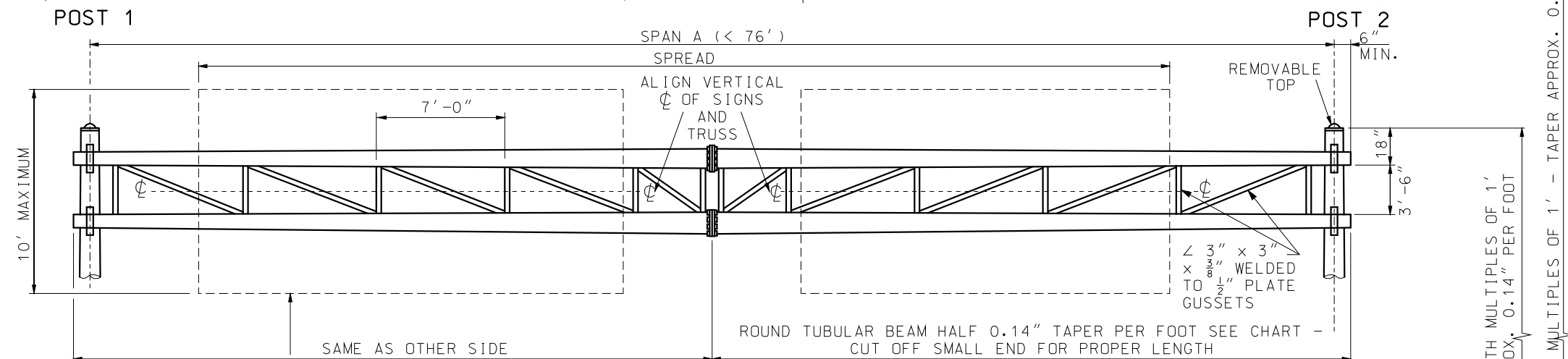
903.05J

SHEET NO.

2 OF 2



| TWO END POST | | | |
|--------------|-----|----------|--------------------------|
| TYPE | GA | D INCHES | ALLOWABLE MOMENT-FT-LBS. |
| S-2315 | 3 | 15 | 120 000 |
| S-2316.5 | 3 | 16.5 | 147 000 |
| S-2318 | 3 | 18 | 177 000 |
| S-27716 | 7+7 | 16 | 214 000 |
| S-2018 | 0 | 18 | 222 000 |
| S-27718 | 7+7 | 18 | 255 000 |
| S-23316.5 | 3+3 | 16.5 | 292 000 |
| S-23317 | 3+3 | 17 | 328 000 |
| S-20018 | 0+0 | 18 | 453 000 |



* EXAMPLE: IF SLOPE IS 1V:6H, THE DENOMINATOR IS 6

GENERAL NOTES:

USE LONGEST POST AND SPAN A (NEXT GREATER IF NOT CHARTED) TO DETERMINE END POSTS AND STRUCTURE DESIGNS. MAXIMUM SIGN AREA FOR GIVEN SPREAD (INTERPOLATE FOR UNCHARTED SPREADS) NOT TO BE EXCEEDED. SUPPORTS DESIGNED BY END POST TYPE AND SPAN A (I.E. S-2315-40 ETC.).

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE TRUSS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER

HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE S
TWO TUBES

DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

903.06J

SHEET NO.
1 OF 2

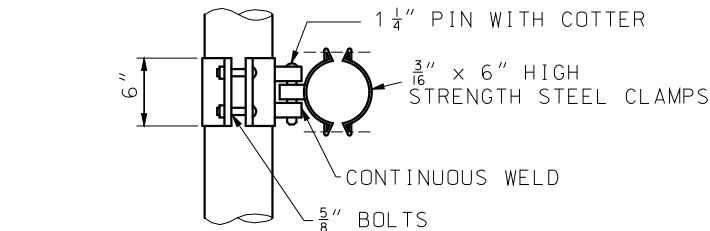
FOOTINGS

| SPAN A | SPREAD IN FEET | | | | | | | | | | | | | | STRUCTURE | | | | | | POSTS FOR MAXIMUM AREA | | | | | | | | | |
|-----------|----------------|---------------|-----------|----------------|------|--------|-------------------------|-----|-----|-----|-----|-----|-----|---|---------------|-------|---------|------------------|----------|----------|------------------------|----------|-----------|-----------|-----------|-----------|-----------|---------|---------|--|
| | | | | | | | | | | | | | | | TUBULAR BEAMS | | | CENTER SECTION B | | | | | | | | | | | | |
| | GA | LARGE DIA. | MIN. L | THICK- NESS | O.D. | LENGTH | LENGTH OF POSTS IN FEET | | | | | | | | | | | | | | | | | | | | | | | |
| FEET | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | | | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | | |
| 40 | 300 | | | | | | | | | | | | | 3 | 9.5" | 20.5' | S-2315 | S-2315 | S-2315 | S-2316.5 | S-2316.5 | S-2316.5 | S-2318 | S-2318 | S-2318 | S-2318 | | | | |
| 45 | 264 | 288 | | | | | | | | | | | | 3 | 9.5" | 23.0' | S-2315 | S-2315 | S-2315 | S-2316.5 | S-2316.5 | S-2316.5 | S-2318 | S-2318 | S-2318 | S-2318 | | | | |
| 50 | 282 | 308 | 336 | | | | | | | | | | | 3 | 10.5" | 25.5' | S-2315 | S-2316.5 | S-2316.5 | S-2316.5 | S-2318 | S-2318 | S-2318 | S-27716 | S-27716 | S-27716 | | | | |
| 55 | 238 | 262 | 284 | 310 | | | | | | | | | | 3 | 10.5" | 28.0' | S-2315 | S-2316.5 | S-2316.5 | S-2316.5 | S-2318 | S-2318 | S-2318 | S-2318 | S-27716 | S-27716 | | | | |
| 60 | 266 | 288 | 314 | 340 | 364 | | | | | | | | | 7 | 14.0" | 30.5' | S-2318 | S-27716 | S-27716 | S-27716 | S-2018 | S-27718 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | | | | |
| 65 | 234 | 256 | 280 | 304 | 328 | 352 | | | | | | | | 7 | 14.0" | 33.0' | S-2318 | S-27716 | S-27716 | S-27716 | S-27716 | S-27718 | S-27718 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | | | |
| 70 | 262 | 284 | 304 | 324 | 346 | 368 | 394 | | | | | | | 3 | 14.0" | 35.5' | S-27716 | S-27716 | S-27716 | S-27718 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23316.5 | S-23317 | | | | |
| 75 | 228 | 248 | 268 | 288 | 308 | 330 | 352 | 374 | | | | | | 3 | 14.0" | 38.0' | S-27716 | S-27716 | S-27716 | S-2018 | S-27718 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23316.5 | S-23316.5 | | | |
| 76 | 295 | 308 | 326 | 350 | 370 | 397 | 425 | 450 | 472 | 502 | | | | 3 | 14.25" | 30.5' | 312" | 14.238" | 16' | S-27716 | S-27718 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23317 | S-23317 | S-20018 | | |
| 79 | 310 | 326 | 347 | 366 | 384 | 410 | 432 | 460 | 490 | 520 | | | | 3 | 14.25" | 28.5' | 312" | 14.238" | 23' | S-2018 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23317 | S-23317 | S-23317 | S-20018 | S-20018 | |
| 83 | 277 | 288 | 300 | 322 | 340 | 360 | 385 | 412 | 434 | 465 | 498 | | | 3 | 14.25" | 30.5' | 312" | 14.238" | 23' | S-27716 | S-2018 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23316.5 | S-23317 | S-23317 | S-20018 | |
| 86 | 297 | 309 | 322 | 337 | 356 | 378 | 402 | 425 | 447 | 473 | 500 | 522 | | 3 | 14.25" | 28.0' | 312" | 14.238" | 30' | S-2018 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23317 | S-23317 | S-20018 | S-20018 | S-20018 | |
| 90 | 269 | 280 | 294 | 310 | 327 | 345 | 363 | 385 | 403 | 426 | 446 | 466 | 485 | 3 | 14.25" | 30.5' | 312" | 14.238" | 30' | S-27716 | S-27718 | S-27718 | S-23316.5 | S-23316.5 | S-23316.5 | S-23317 | S-23317 | S-20018 | S-20018 | |

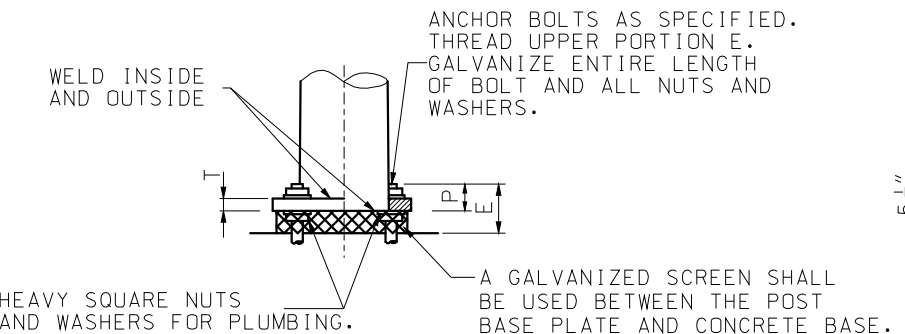
| BASE DATA | | | | | | | | | | FOOTINGS | | | | | | | | ESTIMATED QUANTITIES OF STANDARD FOOTINGS | | | | | | |
|-----------|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------------------|--------------------|----------|-----|-------------------|--------|---------------|-------------------|------------------------------|---------------------|---|---------|-------------------|---------------|---------|--------|-----|
| TYPE NO. | BOLT CIRCLE | C | F | H | P | R | S | T | E | IN EARTH | | | | IN SOLID ROCK | | | | CLASS B CONC | | REINFORCING STEEL | | TOTAL | | |
| | | | | | | | | | | DIA. FD | FH | ANCHOR BOLTS | | RH MAX | ANCHOR BOLTS | | PLATES | CY/FT | CY/IN | #5 BARS NO. | #4 BARS * NO. | | LBS. | |
| | | | | | | | | | | | | DIA. | LENGTH | | DIA. | LENGTH | | | | | | | | |
| S-2315 | 22" | 28 ^{5⁄8"} | 15 ^{1⁄2"} | 2 ^{3⁄8"} | 4 ^{3⁄4"} | 4 ^{5⁄8"} | 23" | 2" | 8 ^{1⁄2"} | 2'-6" | 8' | 2" | 96" | 3' | 2" | AS REQUIRED SEE ROCK FOOTING | 3.5" x 3.5" x 0.75" | 0.1818 | 0.01515 | 6 | 11'-9" | 13 | 7'-2" | 136 |
| S-2316.5 | 23 ^{1⁄2"} | 30 ^{1⁄2"} | 16 ^{5⁄8"} | 2" | 4 ^{3⁄4"} | 5" | 24 ^{1⁄2"} | 2" | 8 ^{1⁄2"} | 3'-0" | 10' | 2" | 96" | 3' | 2" | | 3.5" x 3.5" x 0.75" | 0.2618 | 0.0218 | 6 | 14'-0" | 15 | 8'-9" | 176 |
| S-2318 | 25 ^{1⁄2"} | 33" | 18" | 2" | 4 ^{3⁄4"} | 5 ^{1⁄2"} | 26 ^{1⁄2"} | 2" | 8 ^{1⁄2"} | 3'-0" | 10' | 2" | 96" | 3' | 2" | | 3.5" x 3.5" x 0.75" | 0.2618 | 0.0218 | 6 | 14'-0" | 15 | 8'-9" | 176 |
| S-27716 | 23 ^{1⁄2"} | 30 ^{1⁄2"} | 16 ^{5⁄8"} | 2 ^{5⁄8"} | 5 ^{1⁄2"} | 5" | 24 ^{1⁄2"} | 2 ^{1⁄2"} | 9 ^{1⁄2"} | 3'-0" | 10' | 2 ^{1⁄4"} | 96" | 3' | 2 ^{1⁄4"} | | 4.5" x 4.5" x 0.75" | 0.2618 | 0.0218 | 6 | 14'-0" | 15 | 8'-9" | 176 |
| S-2018 | 25 ^{1⁄2"} | 33" | 18" | 2 ^{5⁄8"} | 5 ^{1⁄2"} | 5 ^{1⁄2"} | 26 ^{1⁄2"} | 2 ^{1⁄2"} | 9 ^{1⁄2"} | 3'-6" | 11' | 2 ^{1⁄4"} | 96" | 4' | 2 ^{1⁄4"} | | 4.5" x 4.5" x 0.75" | 0.3563 | 0.0297 | 6 | 15'-3" | 17 | 10'-4" | 212 |
| S-27718 | 25 ^{1⁄2"} | 33" | 16" | 2 ^{7⁄8"} | 6" | 5 ^{1⁄2"} | 26 ^{1⁄2"} | 2 ^{1⁄2"} | 10 ^{1⁄2"} | 3'-6" | 11' | 2 ^{1⁄2"} | 120" | 4' | 2 ^{1⁄2"} | | 5" x 5" x 1" | 0.3563 | 0.0297 | 6 | 15'-3" | 17 | 10'-4" | 212 |
| S-23316.5 | 23 ^{1⁄2"} | 30 ^{1⁄2"} | 16 ^{5⁄8"} | 3 ^{3⁄8"} | 7" | 5" | 24 ^{1⁄2"} | 3" | 12" | 3'-6" | 12' | 3" | 144" | 4' | 3" | | 5" x 5" x 1" | 0.3563 | 0.0297 | 6 | 16'-3" | 18 | 10'-4" | 226 |
| S-23317 | 25 ^{1⁄2"} | 33" | 18" | 3 ^{3⁄8"} | 7" | 5 ^{1⁄2"} | 26 ^{1⁄2"} | 3" | 12" | 3'-6" | 12' | 3" | 144" | 4' | 3" | | 5" x 5" x 1" | 0.3563 | 0.0297 | 6 | 16'-3" | 18 | 10'-4" | 226 |
| S-20018 | 25 ^{1⁄2"} | 33" | 18" | 3 ^{3⁄8"} | 7" | 5 ^{1⁄2"} | 26 ^{1⁄2"} | 3" | 12" | 4'-0" | 12' | 3" | 144" | 5' | 3" | 5" x 5" x 1" | 0.4654 | 0.0388 | 6 | 16'-6" | 18 | 11'-10" | 245 | |

* ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.

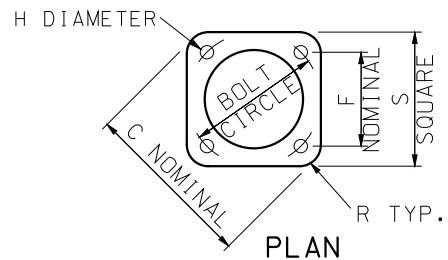
| TUBE DIA. | A | B | NO. OF BOLTS |
|-----------|---------|---------|--------------|
| 9 1/2" | 11 1/2" | 12 1/2" | 4 |
| 10 1/2" | 14 5/8" | 14" | 4 |
| 14.0" | 17 1/4" | 17" | 6 |



BEAM CLAMP DETAIL

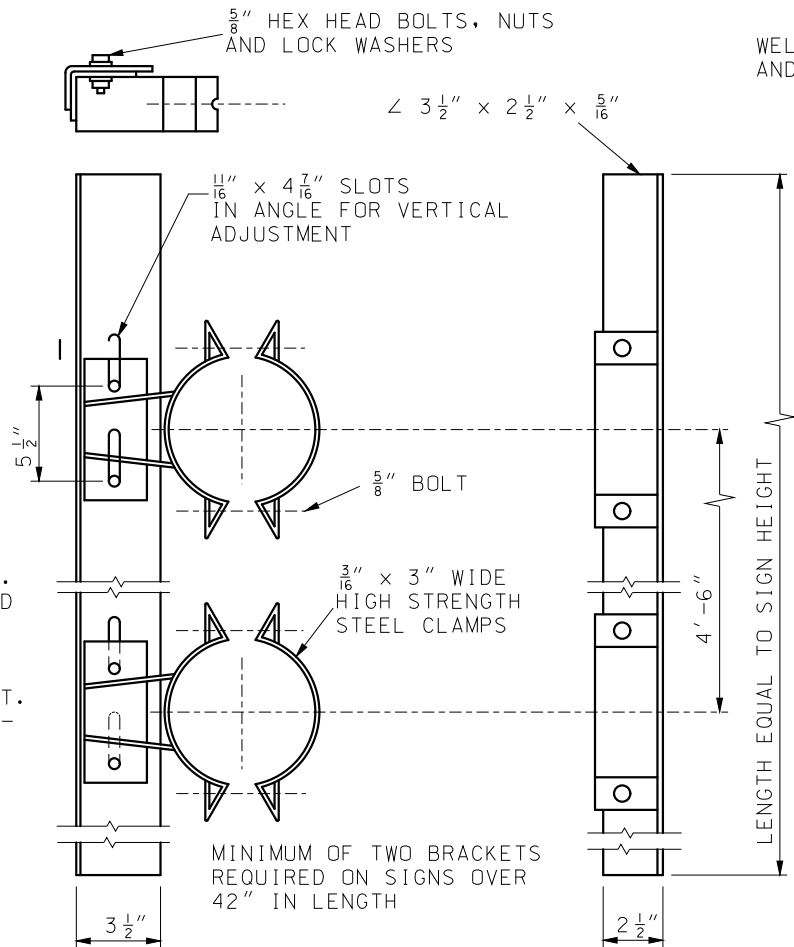


ELEVATION

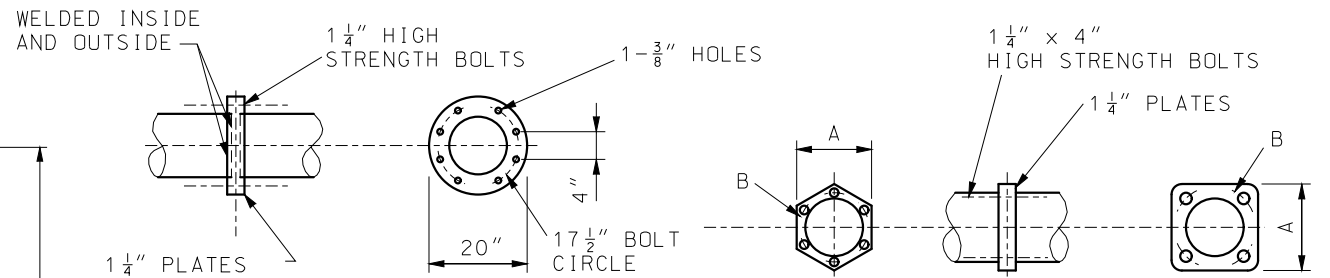


DETAIL B

POST BASE DETAIL



GALVANIZED SIGN BRACKET ASSEMBLY



SPANS 76' TO 90'

BEAM SPLICE DETAIL

SPANS UP TO 76'

| SIGN HEIGHT INCHES | MAX. LIN. FT. OF SIGN WIDTH PER BRACKET |
|--------------------|---|
| 48 & UNDER | 16 |
| 60 | 16 |
| 72 | 15 |
| 84 | 11 |
| 96 | 6 |
| 108 | 4 |
| 120 | 3 |

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

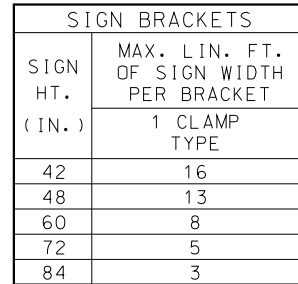
HIGHWAY SIGNING

TUBULAR SUPPORT STEEL
TYPE S
TWO TUBES

DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

903.06J

SHEET NO.
2 OF 2



| ARM = 35 000 PSI | | | | | | |
|------------------|-------------------|------------|------|------|--------------------|------------------------------------|
| TYPE NUMBER | ARM DIMENSIONS | | POST | | MAX. SIGN. AREA | MAX. B. WITH MAX. SIGN. AREA |
| | LENGTH | DIA. / THK | GA | DIA. | SQ. FT. | |
| C-1710-12 | 12' | 6" STD | 7 | 10" | 41 | 8' - 0" |
| C-1710-18 | 18' | 0.280" THK | | | | |
| C-1310-12 | 12' | 6" EX HVY | 3 | 10" | 59 | 8' - 9" |
| C-1310-18 | 18' | 0.432" THK | | | | |

$$\left(\frac{\text{MAX. B FOR TRUE SIGN AREA}}{\text{TRUE SIGN AREA}} \right) \leq \frac{\left(\frac{\text{MAX SIGN AREA}}{\text{AREA}} \right) \times \left(\frac{\text{MAX. B WITH MAX. SIGN AREA}}{\text{SIGN AREA}} \right)}{\left(\text{TRUE SIGN AREA} \right)}$$

ELEVATION

DETAIL A (SEE SHEET 2 OF 2)

HAND HOLE

12"

10"

4' MIN.

3"

CURB OR SHOULDER LINE

MAXIMUM PAVEMENT ELEVATION

2' - 6" - 3"

6" - 6" - 3"

ANCHOR BOLTS

6-#5 BARS EQUALLY SPACED

HALF FH

3"

12"

3"

FD

FH

#4 BARS AT 12" CTRS. SHAPE 34

PLAN

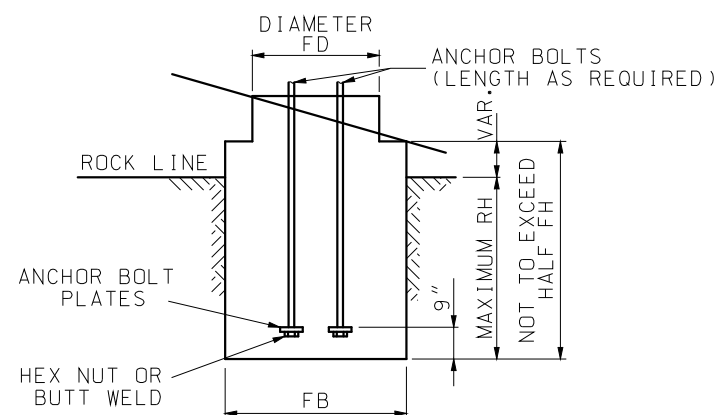
#4 BARS AT 12" CTRS. SHAPE 34

SIX - #5 BARS EQUALLY SPACED

3"

FB

SINGLE ARM CANTILEVER



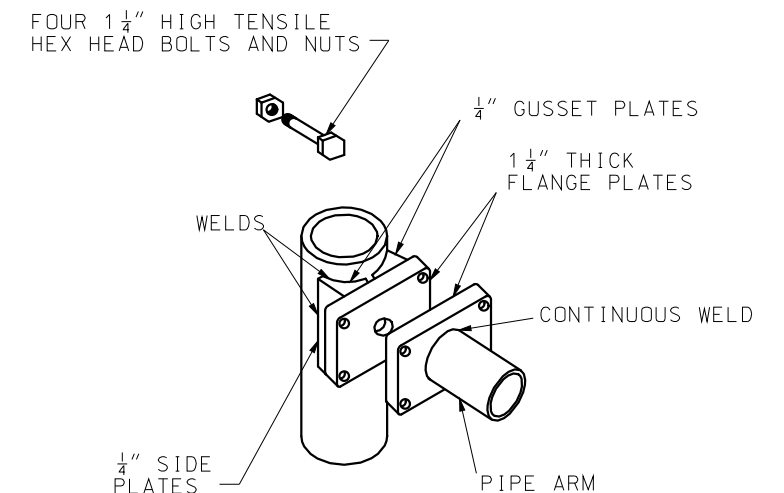
NOTE:
REINFORCEMENT PLACED SAME AS
STANDARD FOOTING. CONCRETE TO BE
POURED TO EXCAVATED FACE OF ROCK.

MODIFIED FOOTING IN SOLID ROCK

| ESTIMATED QUANTITIES | | | | | | | | | | | |
|----------------------|----------|----|--------------------------------|----------|------------|----------|-------------------|-------|--------|-------|-------|
| TYPE NUMBER | DIAMETER | | CU YD CLASS B CONCRETE FOOTING | | | | REINFORCING STEEL | | | | |
| | | | FD SECTION | | FB SECTION | | #5 | | #4 (1) | | TOTAL |
| | FD | FB | 1' DEPTH | 1" DEPTH | 1' DEPTH | 1" DEPTH | NO. | FT-IN | NO. | FT-IN | LBS |
| C-1710 | 2' | 4' | 0.11635 | 0.0097 | 0.2645 | 0.0220 | 6 | 7'-6" | 9 | 5'-7" | 81 |
| C-1310 | 2' | 4' | 0.11635 | 0.0097 | 0.2645 | 0.0220 | 6 | 7'-6" | 9 | 5'-7" | 81 |

(1) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.



| MODIFIED FOOTING IN SOLID ROCK | | | | | | | | |
|--------------------------------|------------------------|---|---------|-------|-------|---|----------|--|
| TYPE NUMBER | ANCHOR BOLT DIA. | ANCHOR BOLT PLATE | FOOTING | | | CLASS B CONCRETE FOOTING FB SECTION CU. YD. | | |
| | | | RH | FD | FB | 1' DEPTH | 1' DEPTH | |
| C-1710 & C-1310 | 1 $\frac{1}{2}$ " | 3 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " | 2'-6" | 2'-0" | 3'-0" | 1904 | 0159 | |
| C-2315 | 2" | 3 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " | 3'-0" | 3'-0" | 3'-6" | 3173 | 0264 | |
| C-2318 | 2" | 3 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " | 3'-6" | 3'-6" | 3'-6" | 3563 | 0297 | |
| C-2018 | 2 $\frac{1}{4}$ " | 4 $\frac{1}{2}$ " x 4 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " | 3'-6" | 3'-6" | 3'-6" | 3563 | 0297 | |

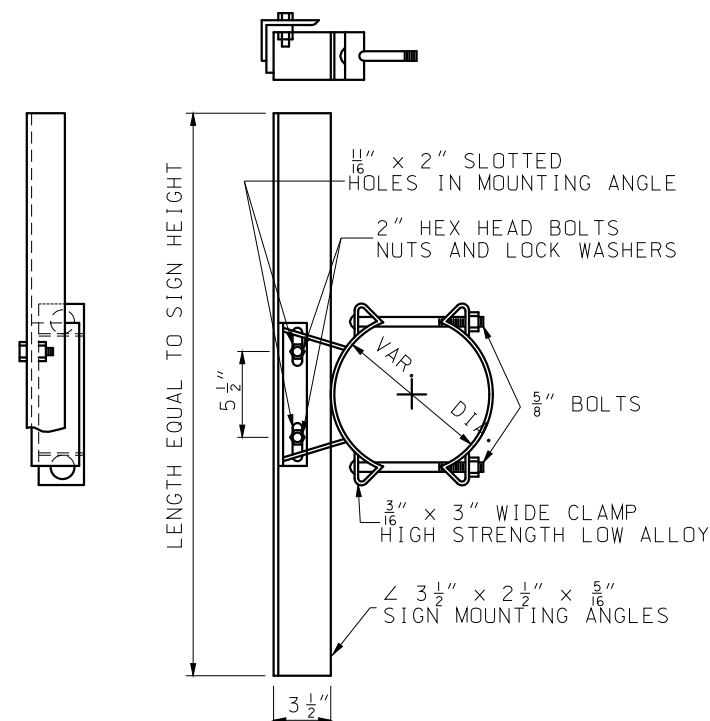


FOR POLE DIAMETER UNDER 12"
ARM ATTACHMENT

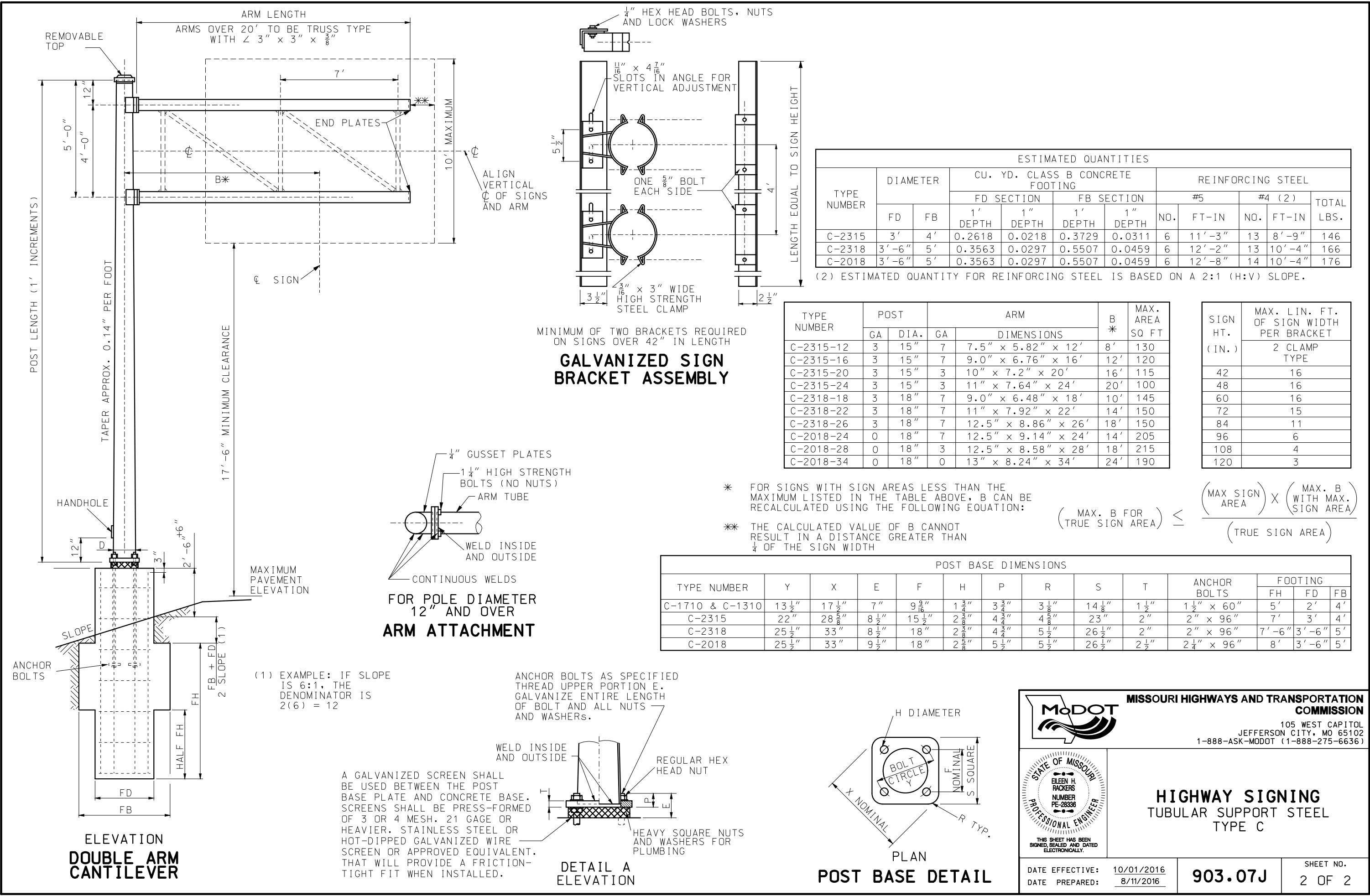
GENERAL NOTE:

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE ARM.

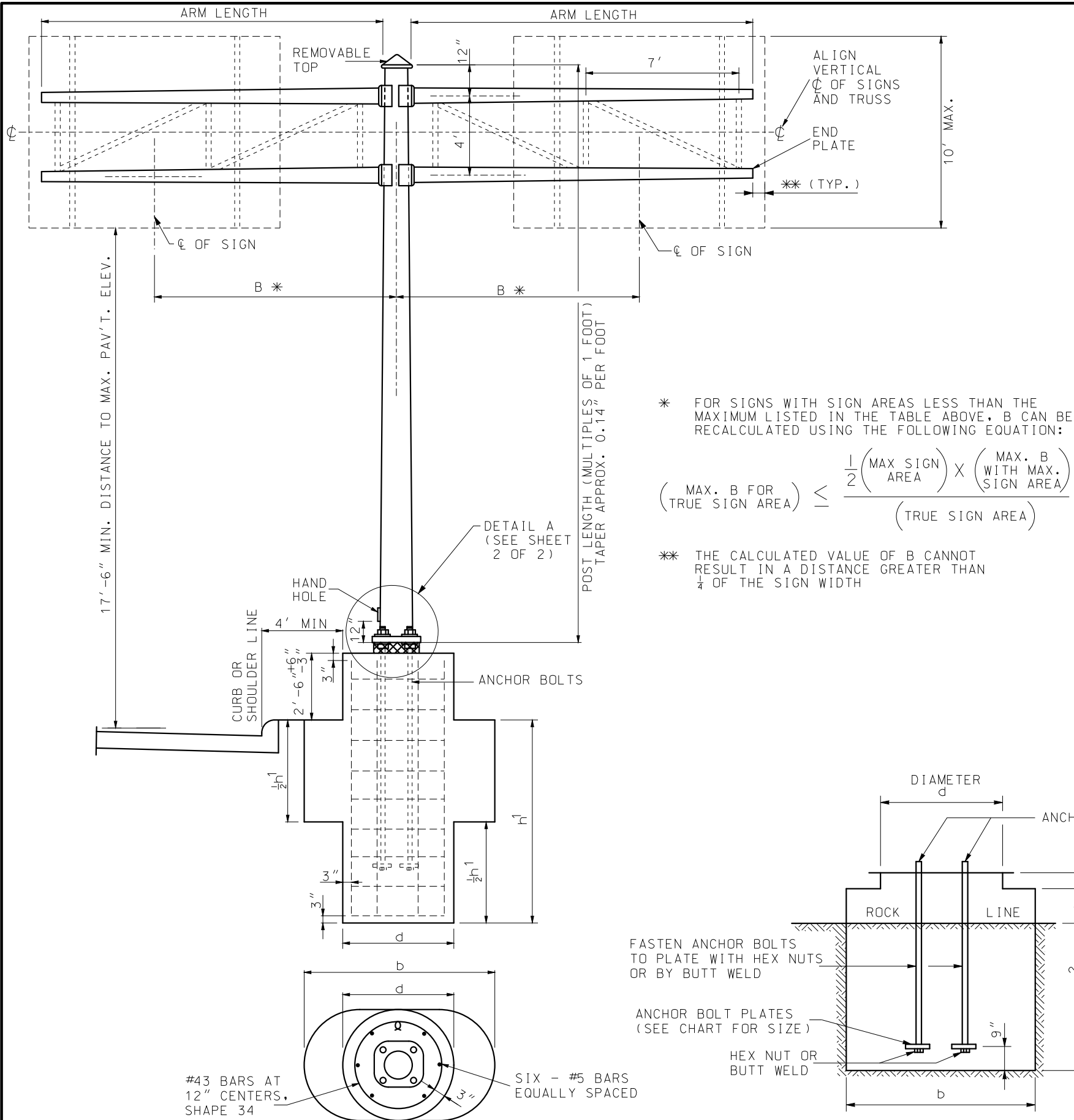
| | | | |
|---|-------------------|--|-----------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | | <h1 style="text-align: center;">HIGHWAY SIGNING</h1> <h2 style="text-align: center;">TUBULAR SUPPORT STEEL TYPE C</h2> | |
| DATE EFFECTIVE: | <u>10/01/2016</u> | <h1 style="font-size: 2em;">903.07J</h1> | SHEET NO. |
| DATE PREPARED: | <u>8/11/2016</u> | | 1 OF 2 |



GALVANIZED SIGN BRACKET ASSEMBLY



IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



* FOR SIGNS WITH SIGN AREAS LESS THAN THE MAXIMUM LISTED IN THE TABLE ABOVE, B CAN BE RECALCULATED USING THE FOLLOWING EQUATION:

$$\left(\text{MAX. B FOR TRUE SIGN AREA} \right) \leq \frac{\frac{1}{2} \left(\text{MAX SIGN AREA} \right) \times \left(\text{MAX. B WITH MAX. SIGN AREA} \right)}{\left(\text{TRUE SIGN AREA} \right)}$$

** THE CALCULATED VALUE OF B CANNOT RESULT IN A DISTANCE GREATER THAN $\frac{1}{4}$ OF THE SIGN WIDTH

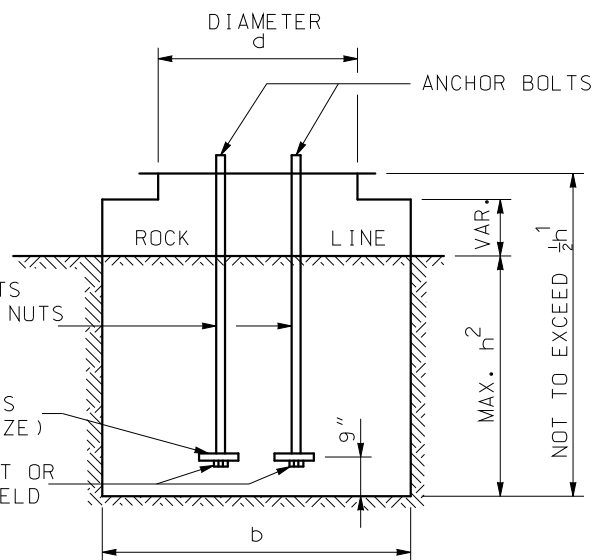
FASTEN ANCHOR BOLTS TO PLATE WITH HEX NUTS OR BY BUTT WELD

ANCHOR BOLT PLATES (SEE CHART FOR SIZE)

HEX NUT OR BUTT WELD

#43 BARS AT 12" CENTERS, SHAPE 34

SIX - #5 BARS EQUALLY SPACED



REINFORCEMENT SAME AS STANDARD FOOTING

CONCRETE TO BE POURED TO EXCAVATED FACE OF ROCK

MODIFIED FOOTINGS IN SOLID ROCK

| TYPE NUMBER | POST | | | ARM | | MAX. AREA (2) SQ. FT. |
|-------------|------|------|------|-----|-------------------------|-----------------------|
| | GA. | "B"* | DIA. | GA. | DIMENSIONS | |
| B-2018 | 0 | 8' | 18" | 7 | 7.5" x 5.82" x 12' | 260 |
| | 0 | 12' | 18" | 7 | 9.0" x 6.76" x 16' | 240 |
| | 0 | 16' | 18" | 3 | 10.0" x 7.2" x 20' | 230 |
| | 0 | 20' | 18" | 3 | 11.0" x 7.64" x 24' (1) | 200 |
| B-23318 | 3+3 | 10' | 18" | 7 | 9" x 6.48" x 18' | 290 |
| | 3+3 | 14' | 18" | 7 | 11" x 7.92" x 22' (1) | 300 |
| | 3+3 | 18' | 18" | 7 | 12.5" x 8.86" x 26' (1) | 300 |
| B-20018 | 0+0 | 14' | 18" | 7 | 12.5" x 9.14" x 24' (1) | 410 |
| | 0+0 | 18' | 18" | 3 | 12.5" x 8.58" x 28' (1) | 430 |
| | 0+0 | 24' | 18" | 0 | 13" x 24" x 34' (1) | 430 |

NOTES:

(1) ARMS OVER 20' TO BE TRUSS TYPE WITH \angle 3" x 3" x $\frac{3}{8}$ " ANGLES.

(2) MAX SIGN AREA ON EACH SIDE EQUALS HALF THE TOTAL IN CHART.

W = 40# PER SQUARE FOOT

| ESTIMATED QUANTITIES | | | | | | | | | | | |
|----------------------|-------------|-------------|---------------------------------|-------------|-------------|-------------|-------------------|---------|--------|---------|-------|
| TYPE NUMBER | DIA. "d" | DIA. "b" | CLASS B CONCRETE FOOTING (C.Y.) | | | | REINFORCING STEEL | | | | |
| | | | "d" SECTION | | "b" SECTION | | #5 | | #4 (3) | | TOTAL |
| | | | 1" DEPTH | 1" DEPTH | 1" DEPTH | 1" DEPTH | NO. | FT.-IN. | NO. | FT.-IN. | |
| B-2018 | 3'-6" | 6'-0" | 0.3563 | 0.0297 | 0.6800 | 0.0567 | 6 | 10'-0" | 11 | 10'-4" | 139 |
| B-23318 | 3'-6" | 7'-0" | 0.3563 | 0.0297 | 0.8100 | 0.0675 | 6 | 10'-6" | 12 | 10'-4" | 149 |
| B-20018 | 3'-6" | 7'-0" | 0.3563 | 0.0297 | 0.8100 | 0.0675 | 6 | 12'-0" | 13 | 10'-4" | 165 |


(3) ESTIMATED QUANTITY FOR REINFORCING STEEL IS BASED ON A 2:1 (H:V) SLOPE.


| MODIFIED FOOTING IN SOLID ROCK | | | | | | CLASS B CONCRETE FOOTING CU. YD. | | |
|--------------------------------|------------------------|------------------------|-------------------|-------|-------|----------------------------------|----------|--|
| TYPE NUMBER | ANCHOR BOLT (4) (DIA.) | ANCHOR BOLT PLATE | FOOTING | | | "b" SECTION | | |
| | | | "h ² " | "d" | "b" | 1' DEPTH | 1" DEPTH | |
| B-2018 | 2 1/4" | 4 1/2" x 4 1/2" x 3/4" | 3'-6" | 3'-6" | 3'-6" | 0.3563 | 0.0297 | |
| B-23318 | 3" | 5 1/2" x 5 1/2" x 1" | 4'-0" | 3'-6" | 4'-6" | 0.4860 | 0.0405 | |
| B-20018 | 3" | 5 1/2" x 5 1/2" x 1" | 5'-0" | 3'-6" | 4'-6" | 0.4860 | 0.0405 | |

(4) ANCHOR BOLT LENGTH AS REQUIRED

GENERAL NOTE:

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL CL OF THE TRUSS.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**
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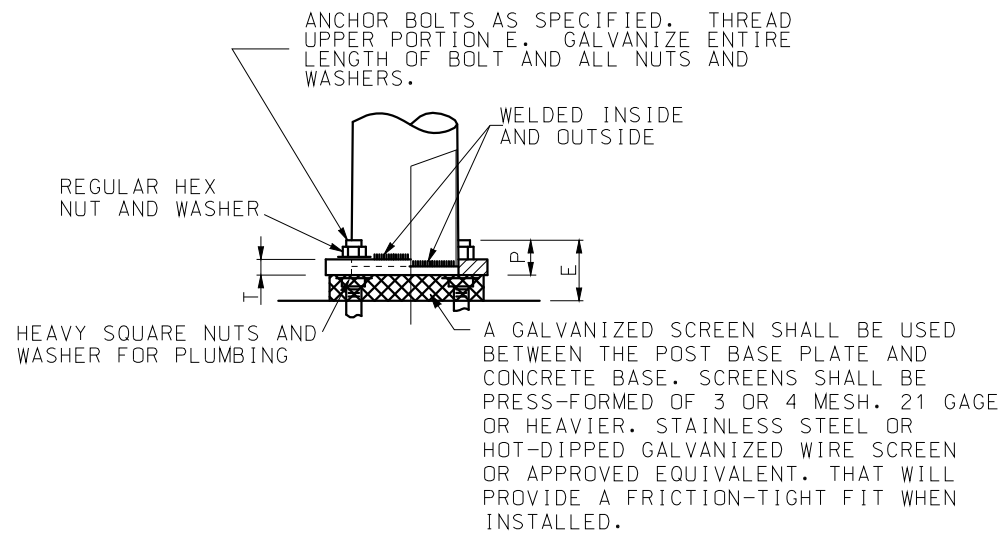
**STATE OF MISSOURI**
EILEEN H. RACKERS
NUMBER PE-28336
PROFESSIONAL ENGINEER
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

HIGHWAY SIGNING
TUBULAR SUPPORT STEEL
TYPE B

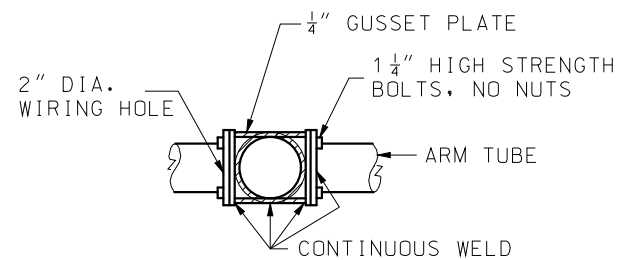
DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

903.08H

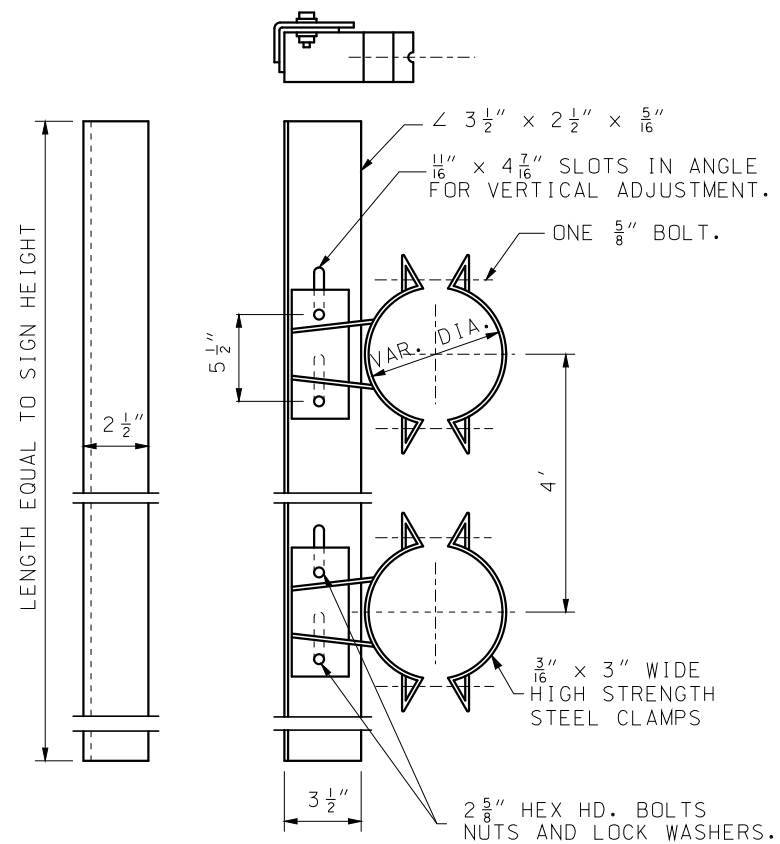
SHEET NO.
1 OF 2



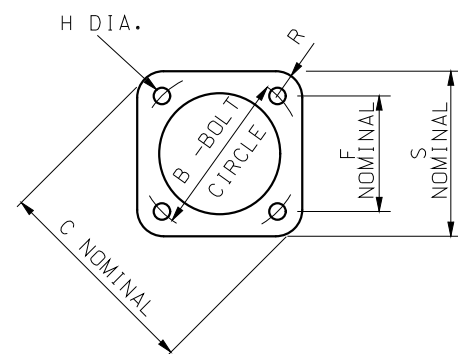
DETAIL A
ELEVATION BASE DETAIL



ARM ATTACHMENT DETAIL



GALVANIZED SIGN BRACKET ASSEMBLY *




PLAN POST BASE DETAIL

| SIGN HEIGHT INCHES | MAX. LIN. FT. OF SIGN WIDTH PER BRACKET |
|--------------------|---|
| 48 & UNDER | 16 |
| 60 | 16 |
| 72 | 15 |
| 84 | 11 |
| 96 | 6 |
| 108 | 4 |
| 120 | 3 |

* MINIMUM OF TWO BRACKETS REQUIRED ON SIGNS OVER 42" IN LENGTH

| POST BASE DIMENSIONS | | | | | | | | | | | FOOTING | | |
|----------------------|---------|-----|-----|--------|---------|--------|--------|--------|--------|--------------|---------|-------|-------|
| TYPE NUMBER | B | C | F | H | S | R | P | T | E | ANCHOR BOLTS | "h" | "d" | "b" |
| B-2018 | 25 1/2" | 33" | 18" | 2 5/8" | 26 1/2" | 5 1/2" | 5 1/2" | 2 1/2" | 9 1/2" | 2 1/4" x 96" | 7'-6" | 3'-6" | 6'-0" |
| B-23318 | 25 1/2" | 33" | 18" | 3 3/8" | 26 1/2" | 5 1/2" | 7" | 3" | 12" | 3" x 120" | 8'-0" | 3'-6" | 7'-0" |
| B-20018 | 25 1/2" | 33" | 18" | 3 3/8" | 26 1/2" | 5 1/2" | 7" | 3" | 12" | 3" x 120" | 9'-6" | 3'-6" | 7'-0" |




MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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HIGHWAY SIGNING

TUBULAR SUPPORT STEEL

TYPE B



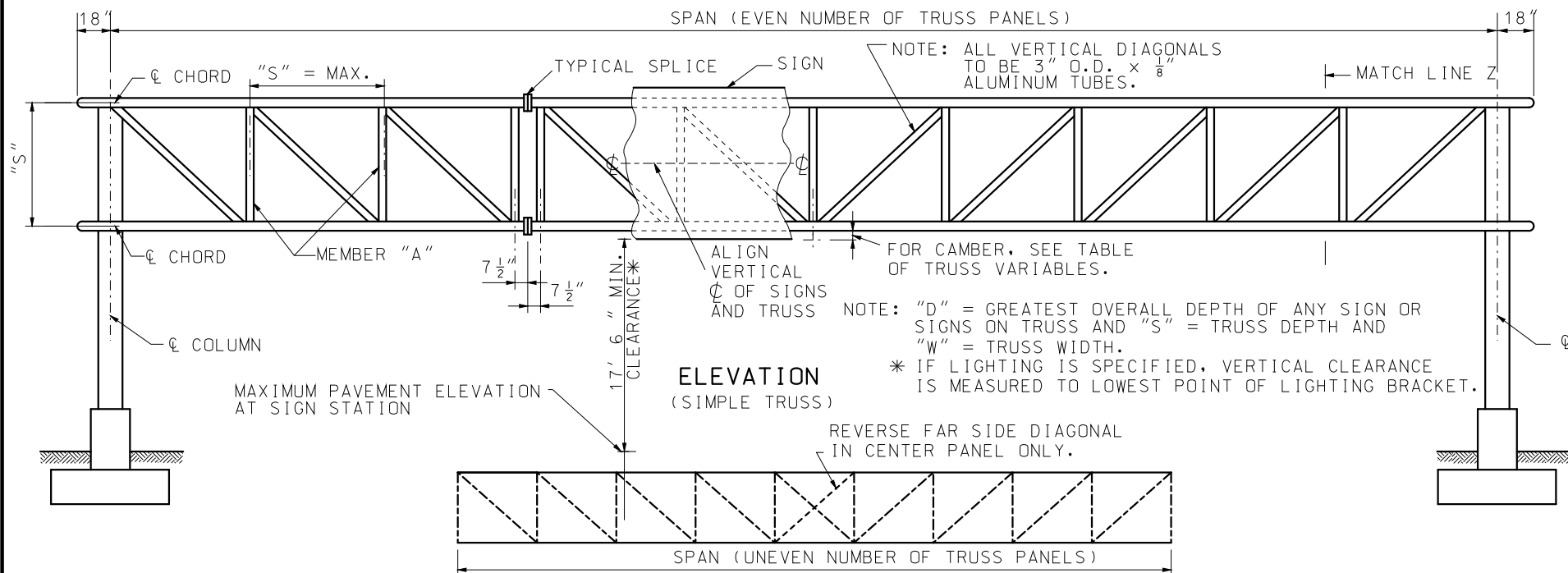
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

903.08H

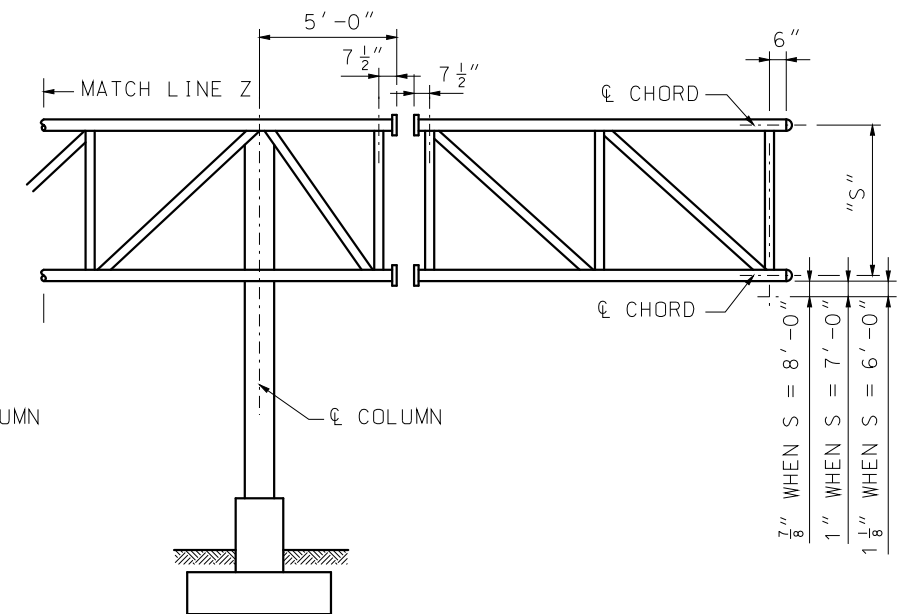
SHEET NO.
2 OF 2

DATE EFFECTIVE: 10/01/2016

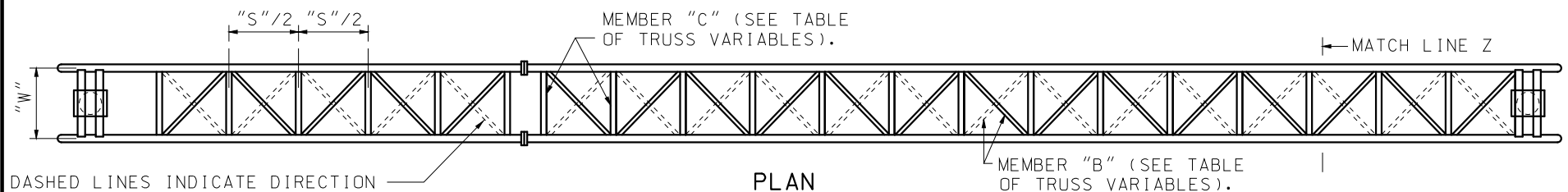
DATE PREPARED: 8/11/2016



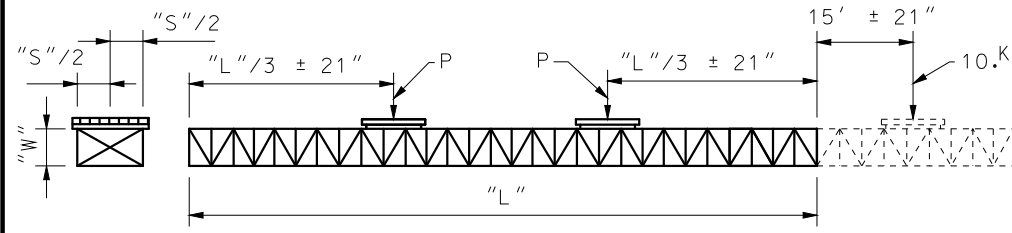
ELEVATION
(SIMPLE TRUSS)



ELEVATION
(SIMPLE TRUSS MODIFIED
FOR CANTILEVER SPAN)



PLAN



$$P = \frac{84\alpha W}{L} - 0.02 L$$
 WHERE
P = CONCENTRATED LOAD IN KIPS.
α = AREA OF ONE CHORD TUBE IN SQUARE INCHES.
(USE 0.76α FOR 4" DIA. x 1/4" AND 4 1/2" DIA. x 1/4" CHORDS)
W = WIDTH OF TRUSS IN FEET.
L = SPAN LENGTH IN FEET.

SAMPLE, GIVEN: α = 4.123 SQ. IN., W = 6'-0" AND L = 100'.
SOLUTION: P = $\frac{84 \times 4.123 \times 6.0}{100} - 0.02 \times 100 = 20.8 - 2 = 18.8$

NOTE:
IF CANTILEVERED, REMOVE CONCENTRATED LOAD NEAREST CANTILEVER END AND LOAD CANTILEVER SPAN AS SHOWN ABOVE.
15' OR LESS CANTILEVER SPANS NEED NOT BE TESTED.
REPEAT ABOVE TESTS BY ROTATING 180° (TO SIMULATE WIND REVERSAL). NO VERTICAL LOAD (D.L.) TEST WILL BE REQUIRED.
LOADS P SHALL NOT BE MORE THAN 16° FOR SPANS LESS THAN 55 FEET AND 20°. FOR ALL OTHERS.

SIMULATED WIND-SHOP TEST LOADING

| TRUSS VARIABLES | | | | | | |
|-----------------|-------|-------|--------------------|--------------------|--------------------|-------------|
| SPAN | "S" | "W" | MEMBER "A" | MEMBER "B" | MEMBER "C" | SHOP CAMBER |
| UP TO 70'-6" | 6'-0" | 5'-0" | 2 1/2" DIA. x 1/8" | 2 1/2" DIA. x 1/8" | 1 3/4" DIA. x 1/8" | 3/4" |
| 71' TO 80'-6" | 6'-0" | 6'-0" | 2 1/2" DIA. x 1/8" | 2 1/2" DIA. x 1/8" | 2" DIA. x 1/8" | 1 1/4" |
| 81' TO 90'-6" | 6'-0" | 6'-0" | 2 1/2" DIA. x 1/8" | 2 3/4" DIA. x 1/8" | 2" DIA. x 1/8" | 1 1/2" |
| 91' TO 100'-6" | 6'-0" | 6'-0" | 2 1/2" DIA. x 1/8" | 2 3/4" DIA. x 1/8" | 2" DIA. x 1/8" | 2 1/4" |
| 101' TO 110'-6" | 7'-0" | 7'-0" | 2 1/2" DIA. x 1/8" | 3" DIA. x 1/8" | 2 1/4" DIA. x 1/8" | 2 1/2" |
| 111' TO 120'-6" | 7'-0" | 7'-0" | 2 1/2" DIA. x 1/8" | 3 1/2" DIA. x 1/8" | 2 1/4" DIA. x 1/8" | 2 3/4" |
| 121' TO 130'-6" | 7'-0" | 7'-0" | 3" DIA. x 1/8" | 3 1/2" DIA. x 1/8" | 2 1/4" DIA. x 1/8" | 3 3/4" |
| 131' TO 140'-6" | 8'-0" | 7'-0" | 3" DIA. x 1/8" | 3 3/4" DIA. x 1/8" | 2 1/2" DIA. x 1/8" | 3" |
| 141' TO 150'-6" | 8'-0" | 7'-0" | 3" DIA. x 1/8" | 3 3/4" DIA. x 1/8" | 2 3/4" DIA. x 1/8" | 3 3/4" |
| 151' TO 160'-6" | 8'-0" | 7'-0" | 3" DIA. x 1/8" | 3 3/4" DIA. x 1/8" | 2 3/4" DIA. x 1/8" | 4 1/2" |

NOTE:
FOR SIZE OF CHORD MEMBERS, SEE DATA SHEET. SHOP CAMBER MAY BE PARABOLIC OR STRAIGHT, BUT SHALL BE SYMMETRICAL ABOUT CENTERLINE OF SPAN.

GENERAL NOTES:
ALL STRUCTURAL STEEL AND COLUMN BASE PLATES ASTM A36.
ALL ANCHOR BOLTS ASTM A307.
PROPOSED FIELD SPLICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL OF THE ENGINEER.
TRUSSES SHALL BE FABRICATED WITH A MINIMUM OF SPLICING IN TRUSS CHORDS.
FIELD SPLICING WILL NOT BE PERMITTED WITHIN THE MIDDLE ONE-THIRD OF SPAN.
PERMISSIBLE VENT HOLES (MAXIMUM 1/8" DIAMETER) SHALL BE PLACED A MINIMUM OF 3" FROM WELD ON LOW SIDE OF HORIZONTAL, VERTICAL AND DIAGONAL TUBES.
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE TRUSS.
FOR ADDITIONAL INFORMATION SEE DATA SHEET.

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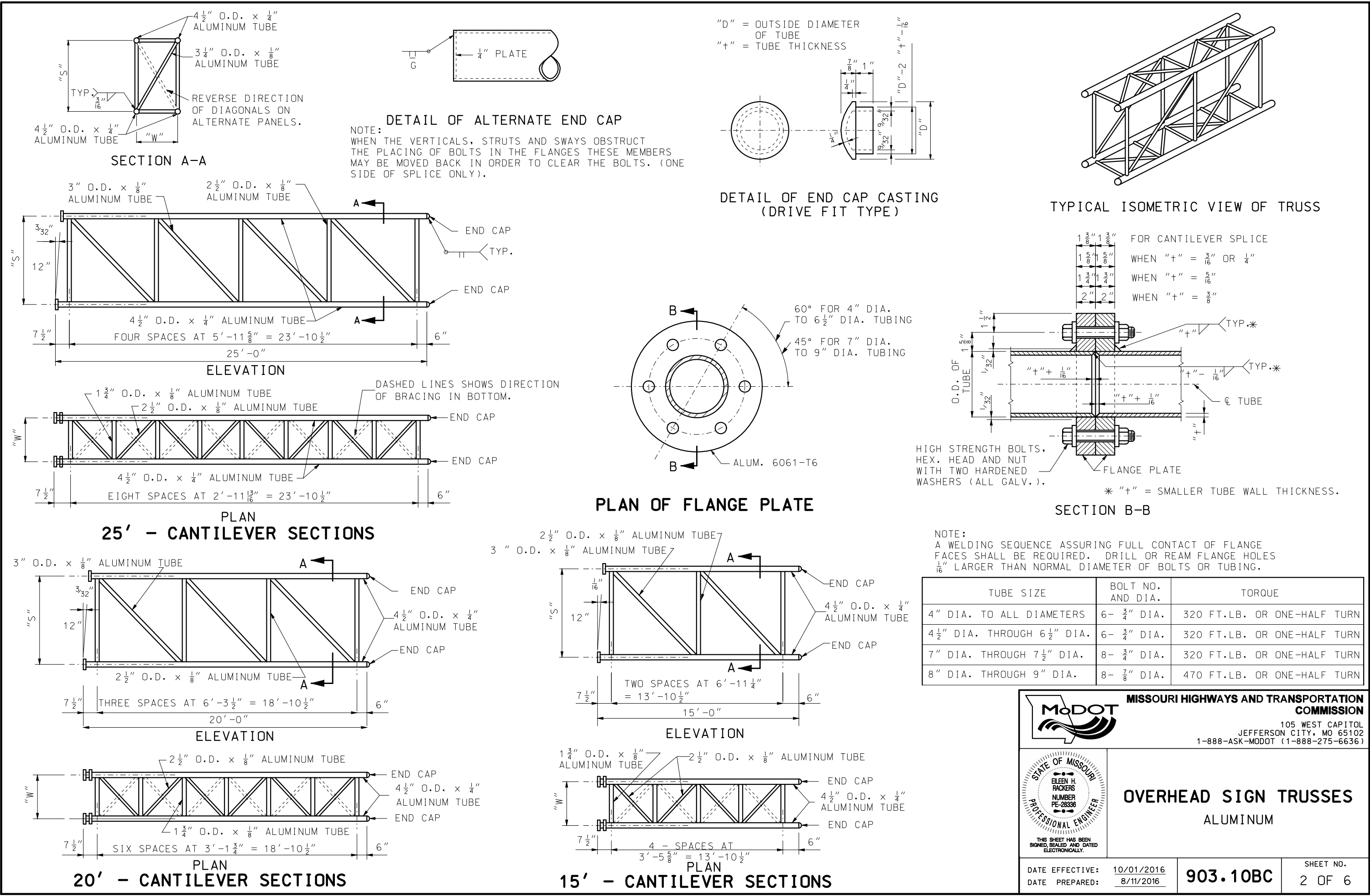
OVERHEAD SIGN TRUSSES
ALUMINUM

DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

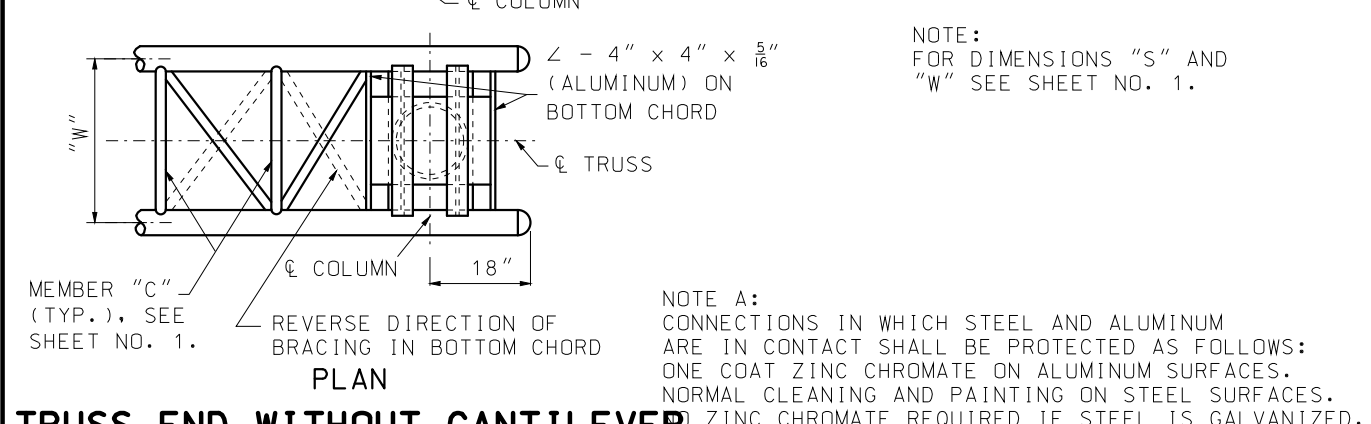
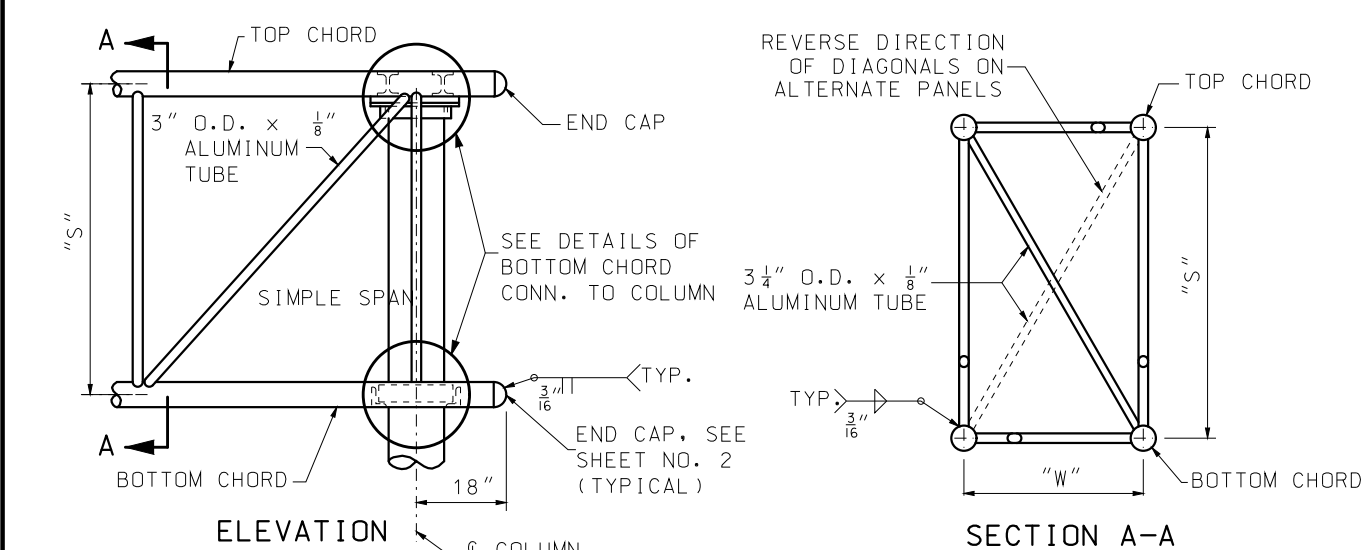
903.10BC

SHEET NO.
1 OF 6

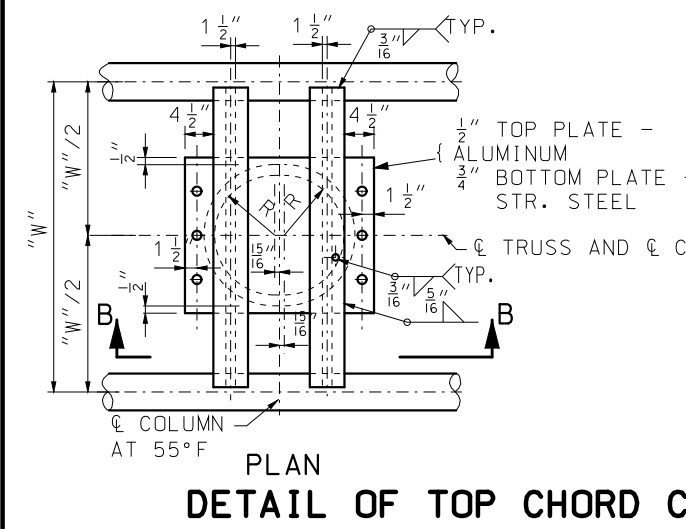
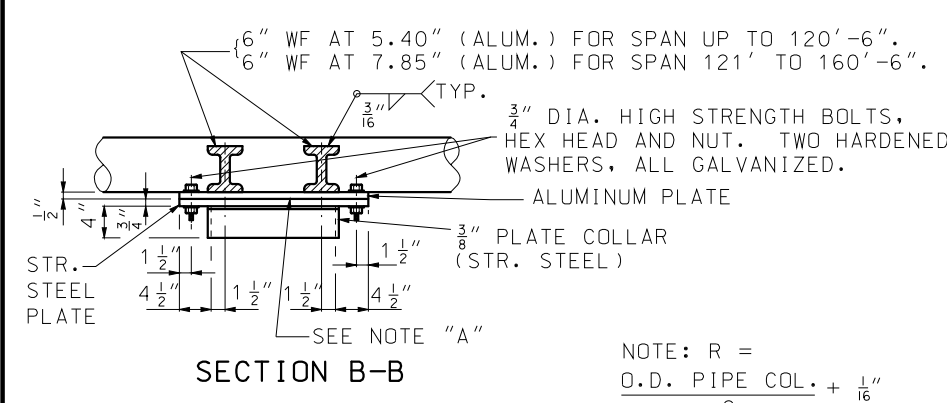
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



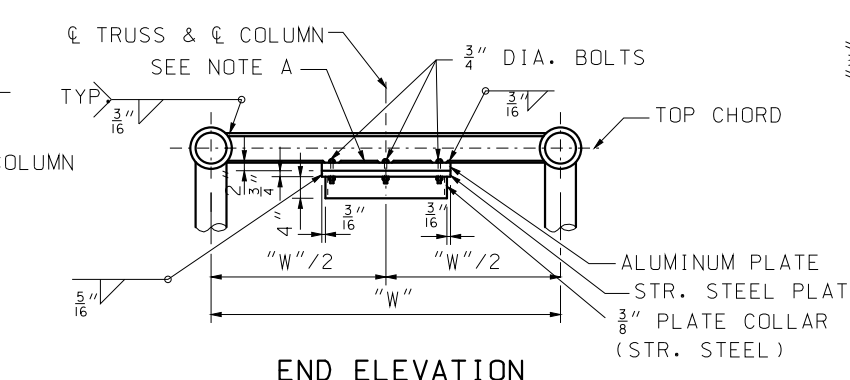
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



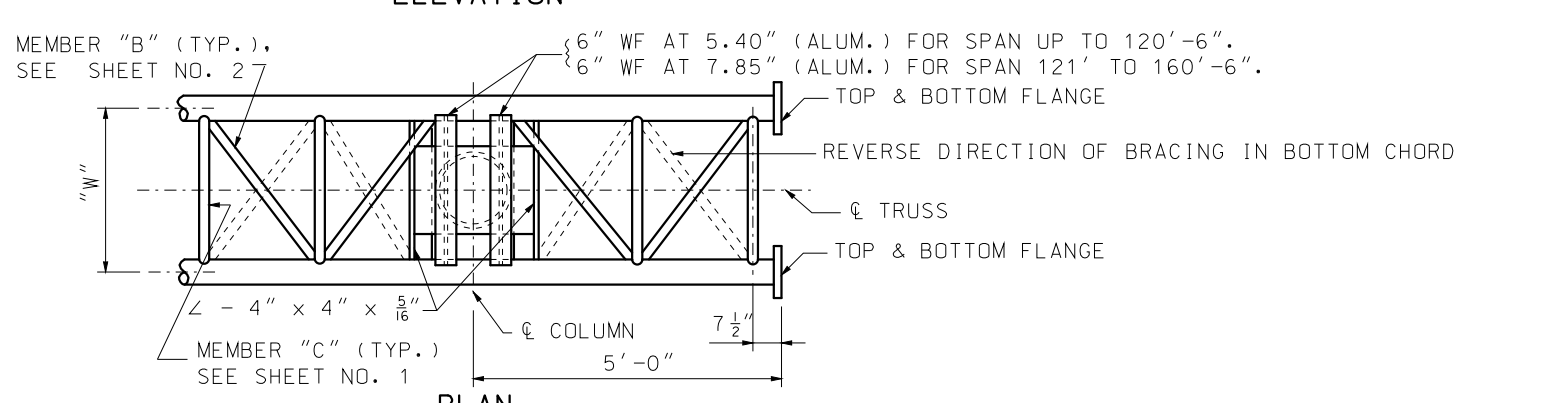
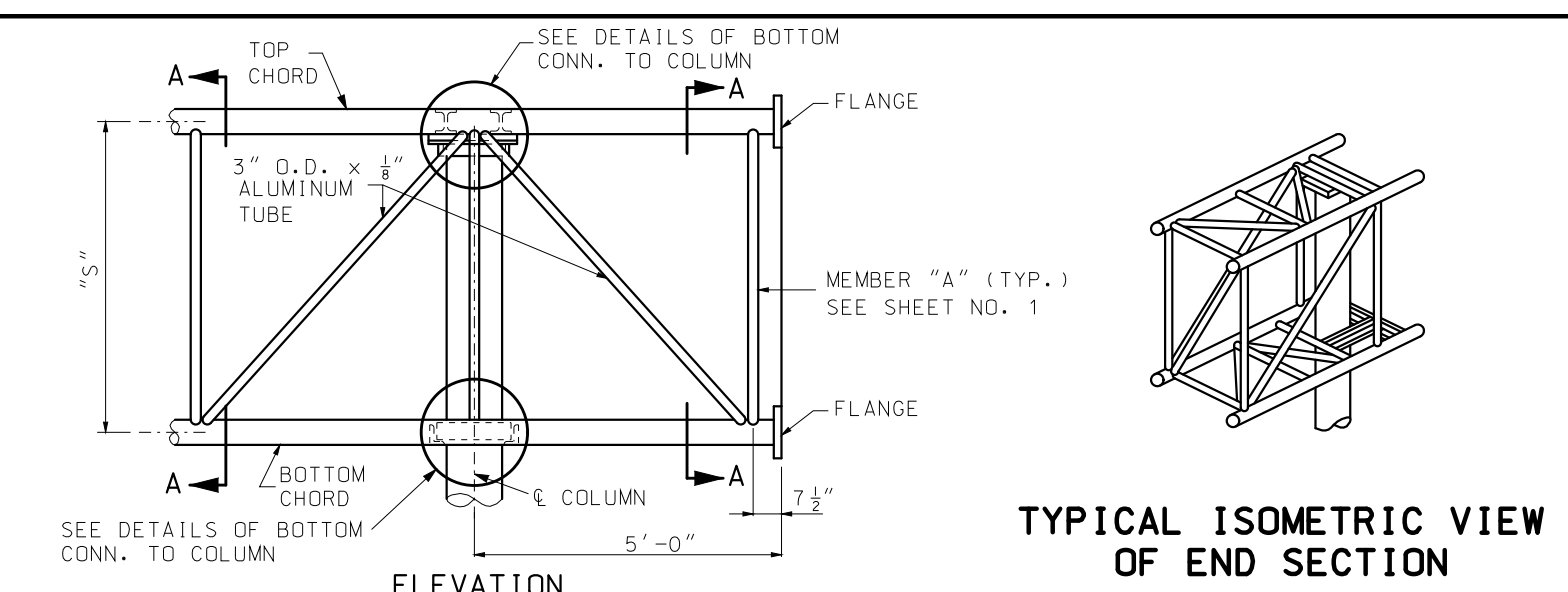
TRUSS END WITHOUT CANTILEVER



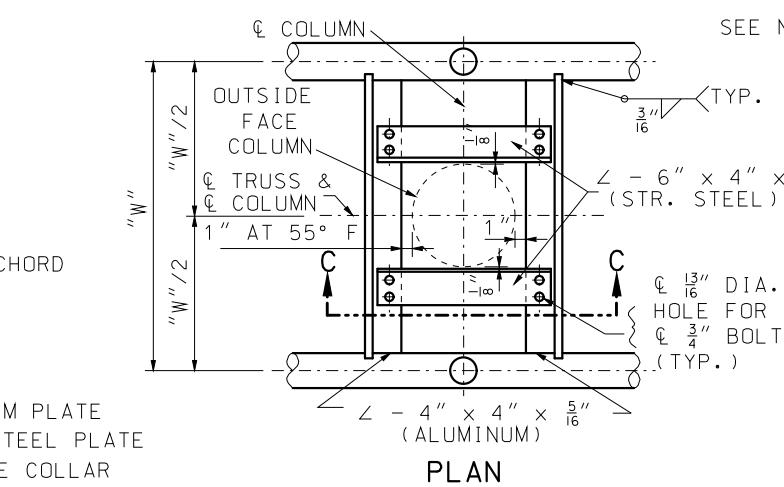
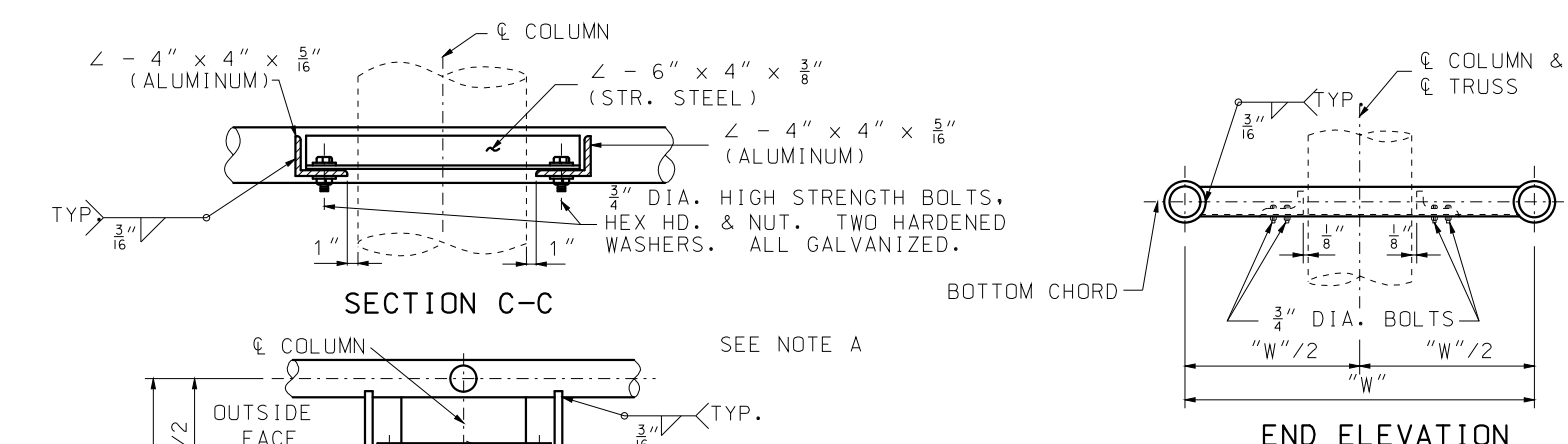
NOTE: $R = \frac{\text{O.D. PIPE COL.} + \frac{1}{16}}{2}$



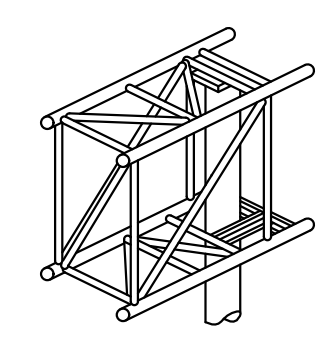
DETAIL OF TOP CHORD CONNECTION TO COLUMN



TRUSS END MODIFIED FOR CANTILEVER



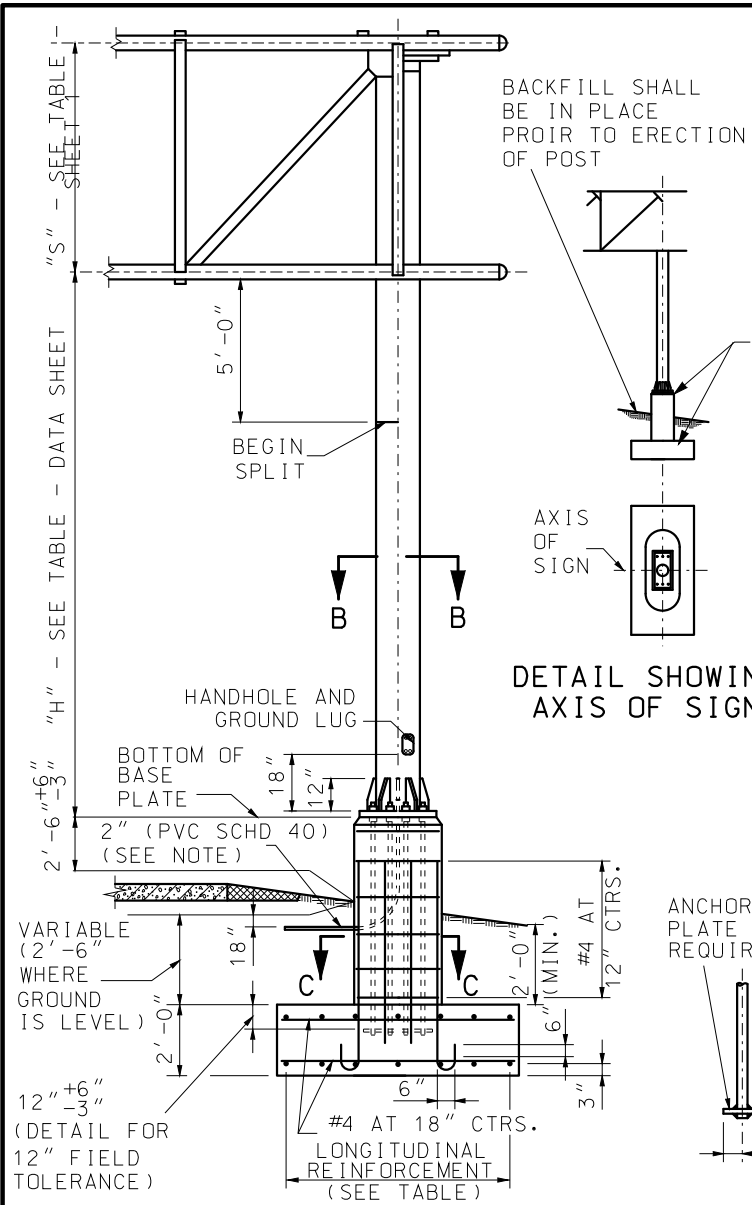
DETAILS OF BOTTOM CHORD CONNECTION TO COLUMN



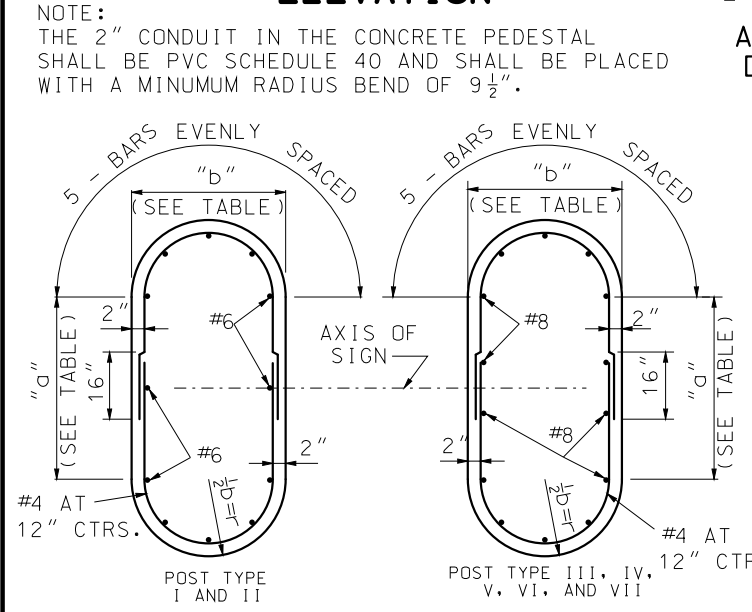
TYPICAL ISOMETRIC VIEW OF END SECTION

| | |
|--|--|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
| | OVERHEAD SIGN TRUSSES ALUMINUM |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016 | 903.10BC SHEET NO. 3 OF 6 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

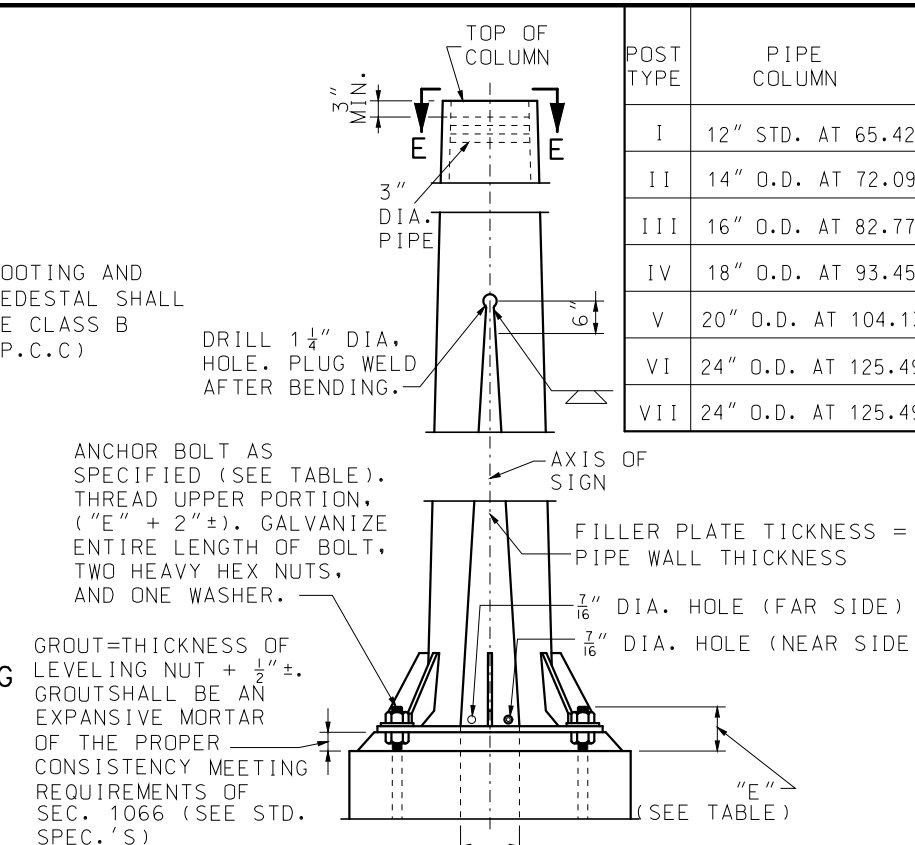


ELEVATION

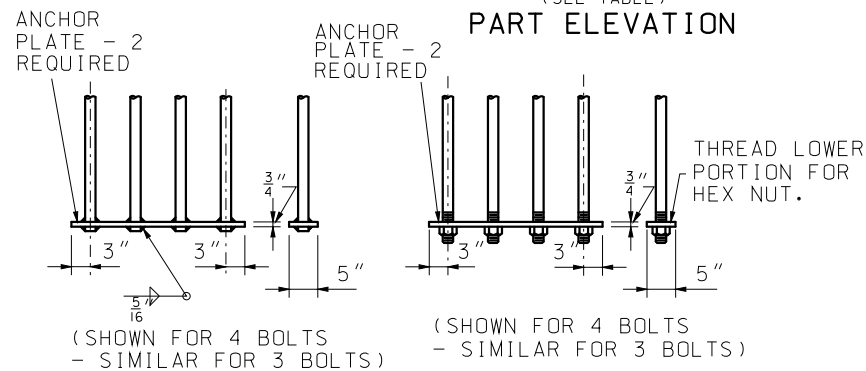


SECTION C-C

(TYPICAL SECTION SHOWING REINFORCING STEEL)
NOTE: FOR DETAILS OF ALTERNATE PEDESTAL, SEE SHEET NO. 5 OF 6.

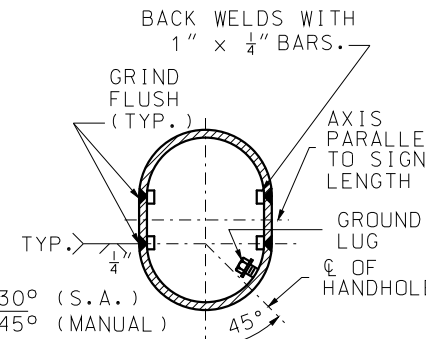


PART ELEVATION

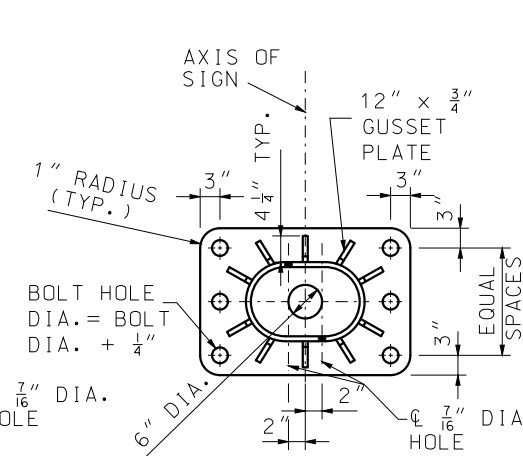
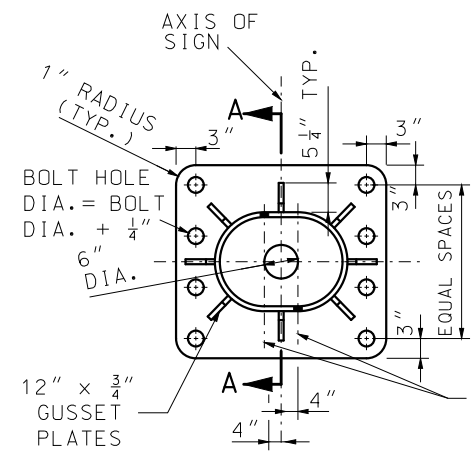


ANCHORAGE DETAIL A

ANCHORAGE DETAIL B



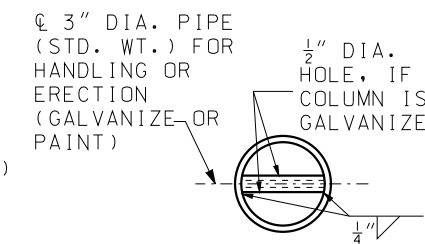
SECTION B-B



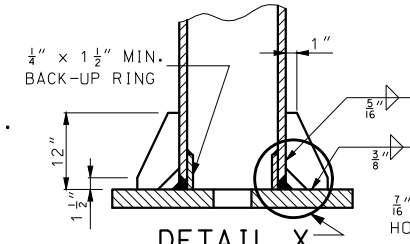
TYPICAL BASE PLATES

| POST TYPE | PIPE COLUMN | DIMENSION "E" | SPLIT | BASE PLATE SIZE* | ANCHOR BOLTS DIA. | PEDESTAL SIZE* | | FOOTING SIZE* | LONGITUDINAL FOOTING REINFORCEMENT | | CONCRETE C.Y. |
|-----------|--------------------|---------------|---------|----------------------|-------------------|----------------|--------|----------------|------------------------------------|------------|---------------|
| | | | | | | a | b | | TOP | BOTTOM | |
| I | 12" STD. AT 65.42 | 8 1/2" | 6" | 2'-6"x 23"x 1 1/2" | 6 AT 2 1/4" | 4'-0" | 2'-11" | 7'-0"x 14'-6" | 7-#5 BARS | 7-#6 BARS | 10.9 |
| II | 14" O.D. AT 72.09 | 8 1/2" | 9 1/2" | 3'-0"x 2'-0"x 1 1/2" | 6 AT 2 1/4" | 4'-4" | 3'-0" | 8'-0"x 16'-0" | 8-#5 BARS | 9-#6 BARS | 13.2 |
| III | 16" O.D. AT 82.77 | 8 3/4" | 11 1/2" | 3'-4"x 2'-2"x 1 3/4" | 6 AT 2 1/4" | 4'-8" | 3'-2" | 8'-6"x 17'-6" | 9-#5 BARS | 9-#7 BARS | 15.2 |
| IV | 18" O.D. AT 93.45 | 9 1/2" | 12 1/2" | 3'-7"x 2'-4"x 2" | 6 AT 2 1/2" | 5'-1" | 3'-4" | 9'-6"x 19'-0" | 10-#5 BARS | 10-#8 BARS | 18.1 |
| V | 20" O.D. AT 104.13 | 9 1/2" | 13" | 3'-10"x 2'-9"x 2" | 8 AT 2 1/2" | 5'-4" | 3'-9" | 10'-0"x 20'-0" | 10-#5 BARS | 10-#8 BARS | 20.6 |
| VI | 24" O.D. AT 125.49 | 9 1/2" | 10 1/2" | 4'-0"x 3'-3"x 2" | 8 AT 2 1/2" | 5'-6" | 4'-3" | 10'-6"x 21'-0" | 11-#5 BARS | 11-#8 BARS | 23.3 |
| VII | 24" O.D. AT 125.49 | 9 1/2" | 13 1/2" | 4'-3"x 3'-3"x 2" | 8 AT 2 1/2" | 5'-9" | 4'-3" | 11'-0"x 22'-0" | 11-#5 BARS | 11-#9 BARS | 25.1 |

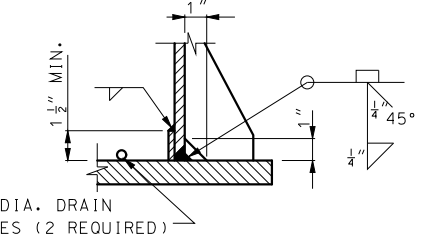
* BASE PLATES, PEDESTAL, AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



PART SECTION E-E



PART SECTION A-A



DETAIL X

GENERAL NOTES:

A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; A.S.T.M. SPECIFICATION A53. NO OBJECTIONABLE SEAMS WILL BE PERMITTED.

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.

A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF 5'-0".

QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF 2'-0".

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI
EILEEN H. RACKER
NUMBER PE-28336
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

OVERHEAD SIGN TRUSSES

ALUMINUM

DATE EFFECTIVE: 10/01/2016
DATE PREPARED: 8/11/2016

903.10BC

SHEET NO. 4 OF 6

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



(TO BE USED ADJACENT TO TYPE "A" OR "C" MEDIAN BARRIER)

NOTE:
THE 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL
BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A
MIN. RADIUS BEND OF 9 1/2".



| POST TYPE | PIPE COLUMN | PEDESTAL SIZE * | | FOOTING SIZE * | LONGITUDINAL FOOTING REINFORCEMENT | | CONCRETE C.Y. | |
|--------------|--------------------|--------------------|--------|-------------------|--|--------------|-----------------------------|-----------------------------|
| | | c | d | | TOP | BOTTOM | TYPE A MEDIAN BARRIER | TYPE C MEDIAN BARRIER |
| I | 12" STD. AT 65.42 | 5'-9" | 2'-1" | 7'-0" x 14'-6" | 7 - #5 BARS | 7 - #6 BARS | 10.9 | 11.6 |
| II | 14" O.D. AT 72.09 | 6'-2" | 2'-2" | 8'-0" x 16'-0" | 8 - #5 BARS | 9 - #6 BARS | 13.2 | 14.0 |
| III | 16" O.D. AT 82.77 | 6'-7" | 2'-4" | 8'-6" x 17'-6" | 9 - #5 BARS | 9 - #7 BARS | 15.2 | 16.1 |
| IV | 18" O.D. AT 93.45 | 7'-1" | 2'-6" | 9'-6" x 19'-0" | 10 - #5 BARS | 10 - #8 BARS | 18.1 | 19.1 |
| V | 20" O.D. AT 104.13 | 7'-8" | 2'-11" | 10'-0" x 20'-0" | 10 - #5 BARS | 10 - #8 BARS | 20.6 | 21.7 |
| VI | 24" O.D. AT 125.49 | 8'-3" | 3'-5" | 10'-6" x 21'-0" | 11 - #5 BARS | 11 - #8 BARS | 23.3 | 24.6 |
| VII | 24" O.D. AT 125.49 | 8'-6" | 3'-5" | 11'-0" x 22'-0" | 11 - #5 BARS | 11 - #9 BARS | 25.1 | 26.5 |

* BASE PLATES, PEDESTAL, AND FOOTINGS LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.

GENERAL NOTES:

A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B"
SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC
RESISTANCE WELDED STEEL PIPE; A.S.T.M. SPECIFICATION
A53.

NO OBJECTIONABLE SEAMS WILL BE PERMITTED.

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.



PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES
PERTAINING TO THESE ITEMS HAVE BEEN OMITTED
FOR CLARITY. REFER TO SHEET NO. 4 OF 6 FOR DETAILS OF
THESE ITEMS.

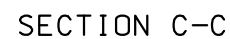
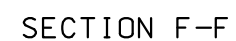
GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

QUANTITIES FOR PEDESTAL, BASED ON NOMINAL HEIGHT OF
5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C
MEDIAN BARRIER).

QUANTITIES FOR FOOTING, BASED ON NOMINAL DEPTH OF
2'-0".

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.

| | | |
|---|--|---|
|  | <h1 style="margin: 0;">MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</h1> <p style="margin: 0;">105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
|  | <h2 style="margin: 0;">OVERHEAD SIGN TRUSSES</h2> <h3 style="margin: 0;">ALUMINUM</h3> | |
| <p>DATE EFFECTIVE: <u>10/01/2016</u></p> <p>DATE PREPARED: <u>8/11/2016</u></p> | <h1 style="margin: 0;">903.10BC</h1> | <p>SHEET NO.</p> <h2 style="margin: 0;">5 OF 6</h2> |



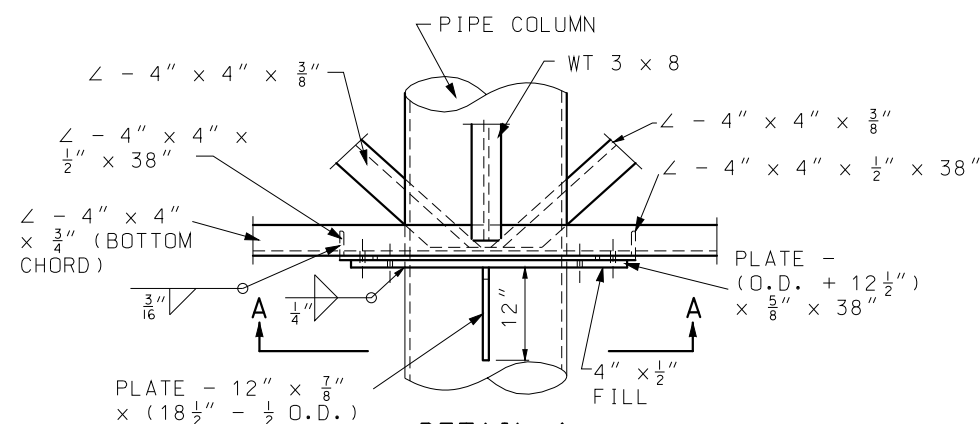
**) LOCATE THE INTERIOR DIAGONAL AS CLOSE AS POSSIBLE TO THE CENTERLINE OF THE PANEL POINT WITHOUT OVERLAPPING WELDS.

ALL MATERIAL ALUMINUM EXCEPT AS NOTED.

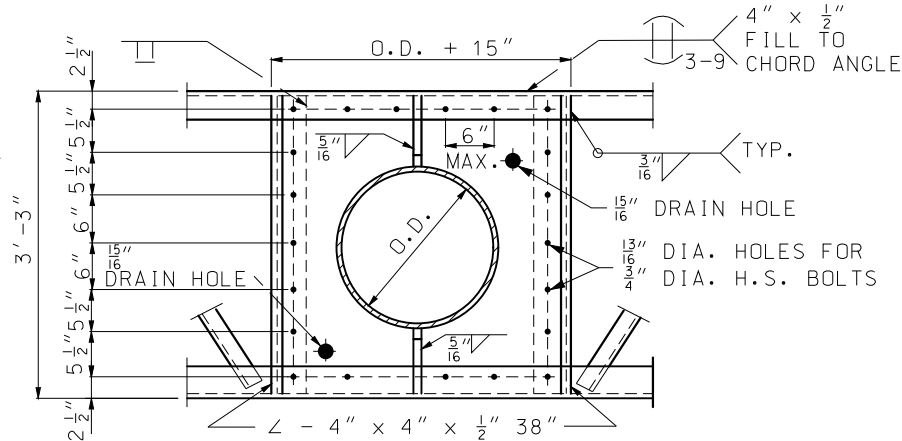


903.10BC

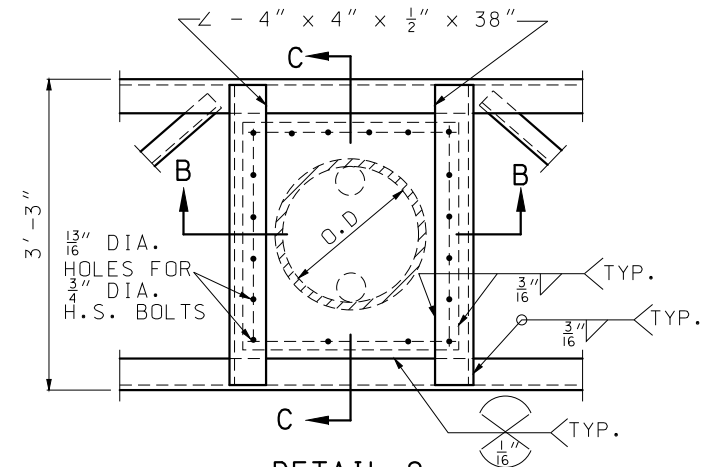
SHEET NO.
6 OF 6



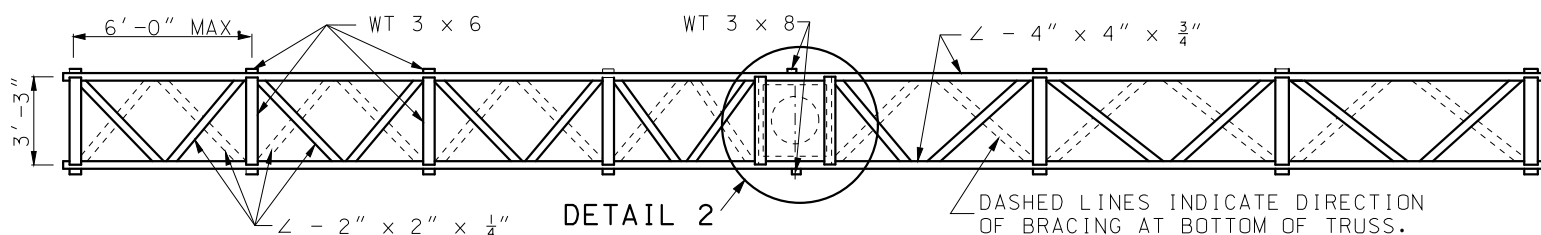
DETAIL 1
TRUSS BOTTOM CONNECTION TO COLUMN



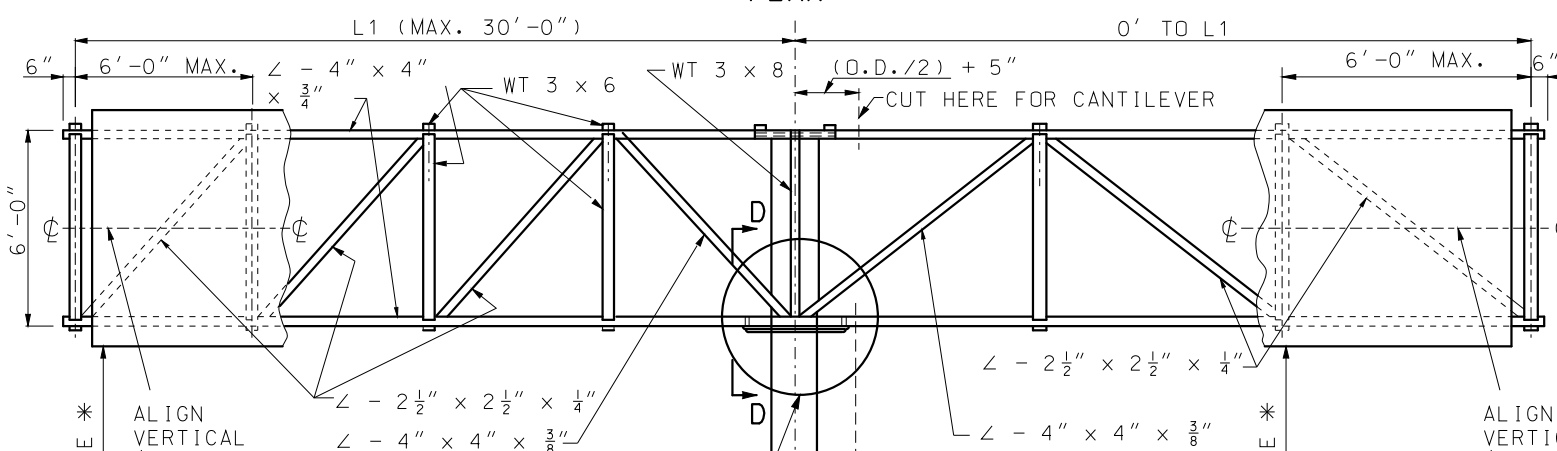
SECTION A-A



DETAIL 2
TRUSS TOP CONNECTION TO COLUMN

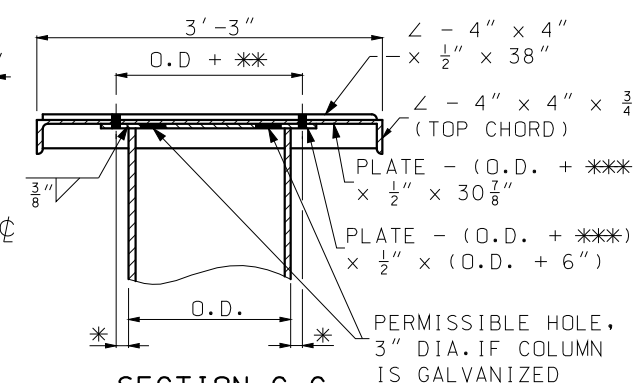


DETAIL 2
PLAN



DETAIL 1

- * 1 1/2" FOR POST TYPE VII
1 3/4" FOR ALL OTHER POST TYPES
- ** 3" FOR POST TYPE VII
3 1/2" FOR ALL OTHER POST TYPES
- *** 5 1/2" FOR POST TYPE VII
6" FOR ALL OTHER POST TYPES



SECTION C-C

SECTION B-B

GENERAL NOTES:

ALL FASTENERS SHALL HAVE A HARDENED WASHER UNDER THE NUT OR BOLT HEAD, WHICHEVER IS TURNED IN TIGHTENING.

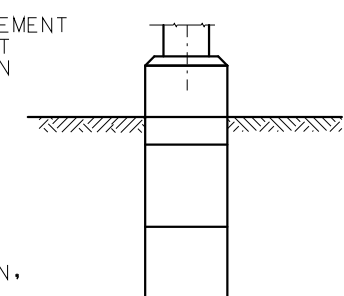
ZINC CHROMATE PRIMER SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATION TT-P-645 OR TT-P-1757 AND SHALL BE ACCEPTED ON THE BASIS OF THE LABEL SHOWING CONFORMANCE OR A MANUFACTURER'S CERTIFICATION.

DESIGN OF STRUCTURAL SUPPORTS SHALL COMPLY WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS 2001 AND CURRENT INTERIMS.

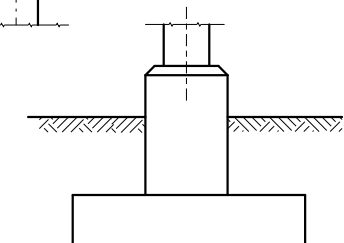
DESIGN OF SPREAD FOOTINGS SHALL COMPLY WITH 1994 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL ϕ OF THE TRUSS.

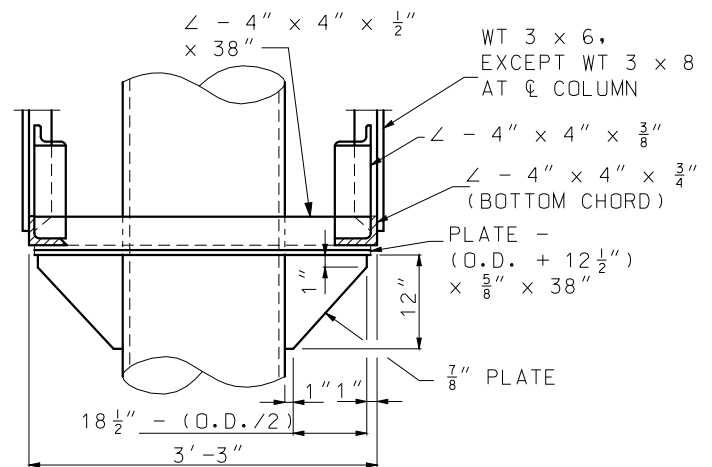
NOTE:
TRUSSES AND COLUMN BASE
PLATES: ASTM A36, ANCHOR
BOLTS: ASTM A307.
FOR ADDITIONAL INFORMATION,
SEE DATA SHEET.




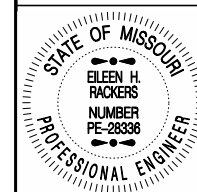
ELEVATION
DRILLED SHAFT OPTION



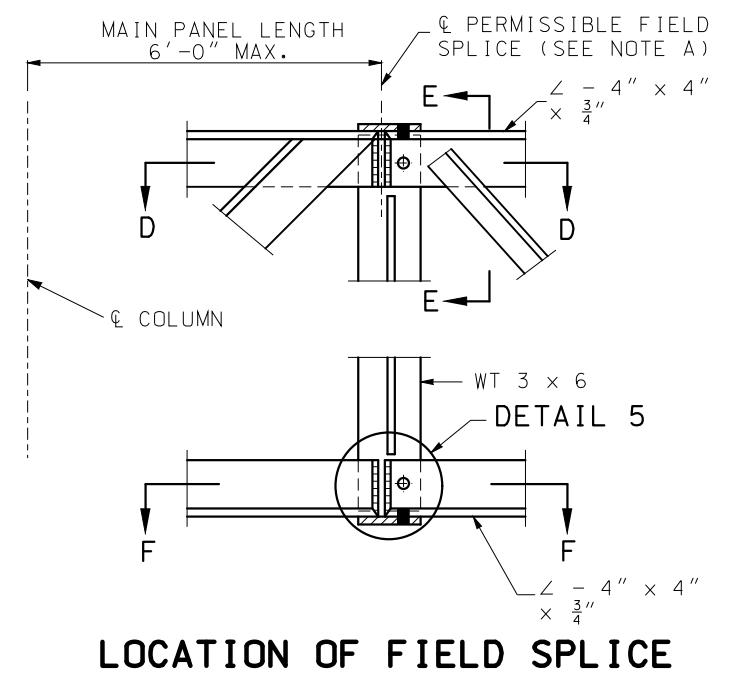
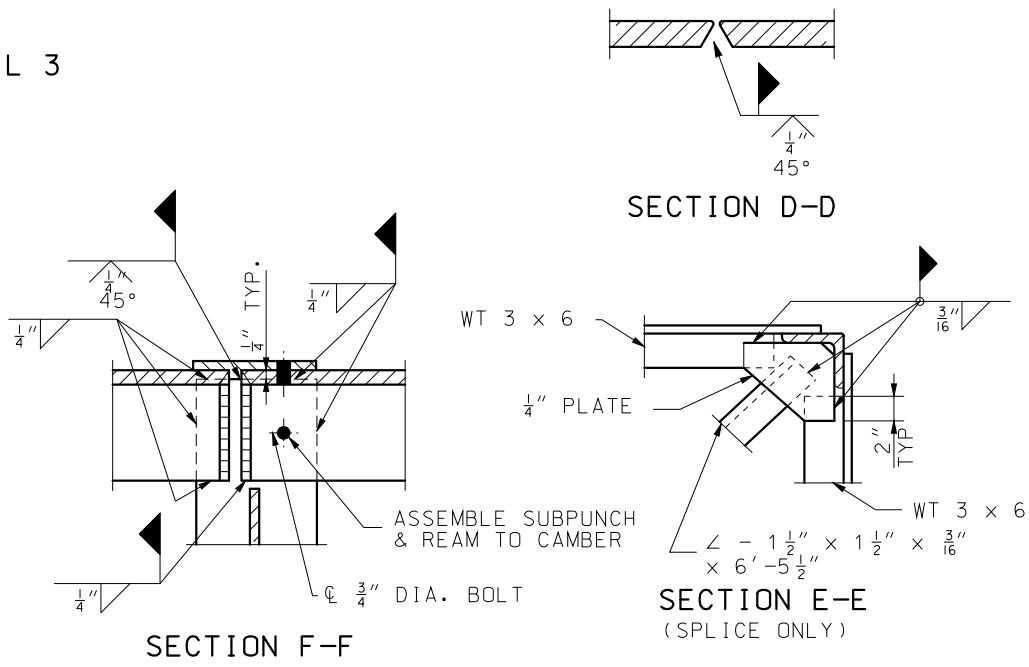
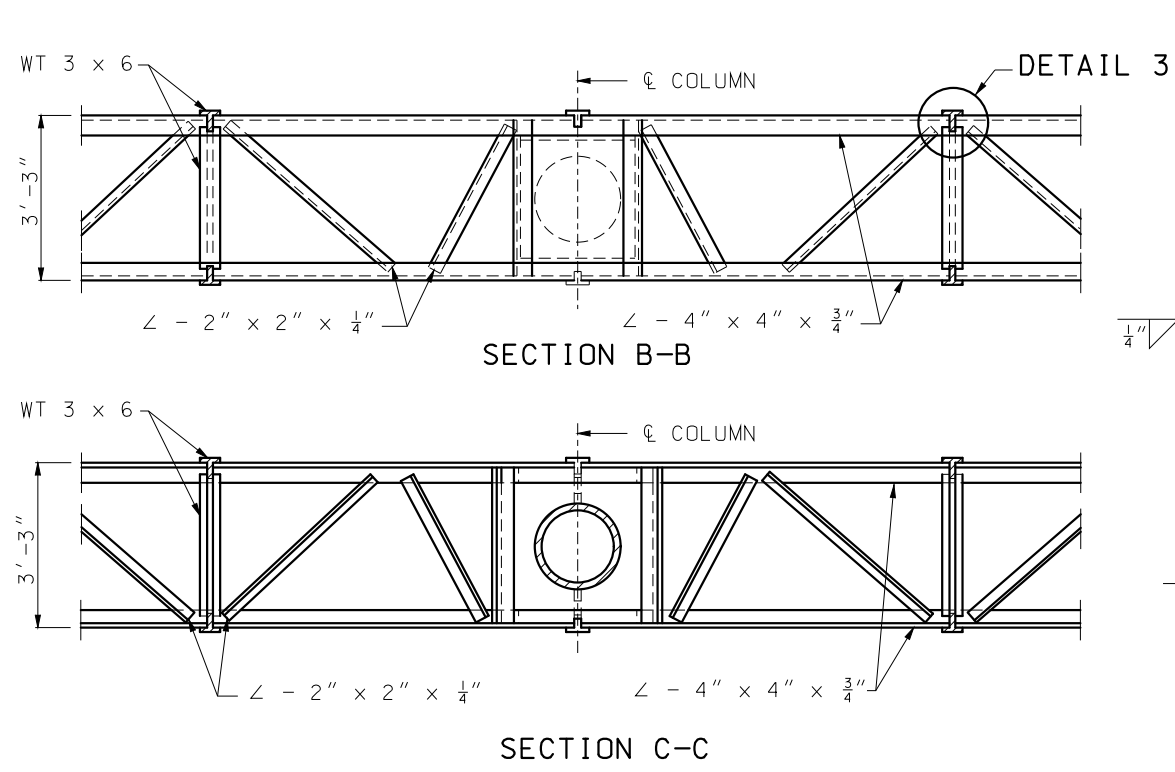
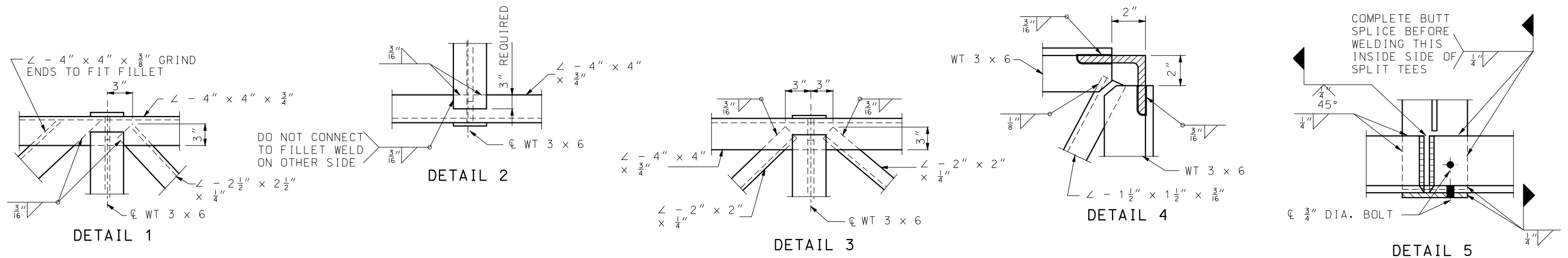
ELEVATION
SPREAD FOOTING OPTION



SECTION D-D

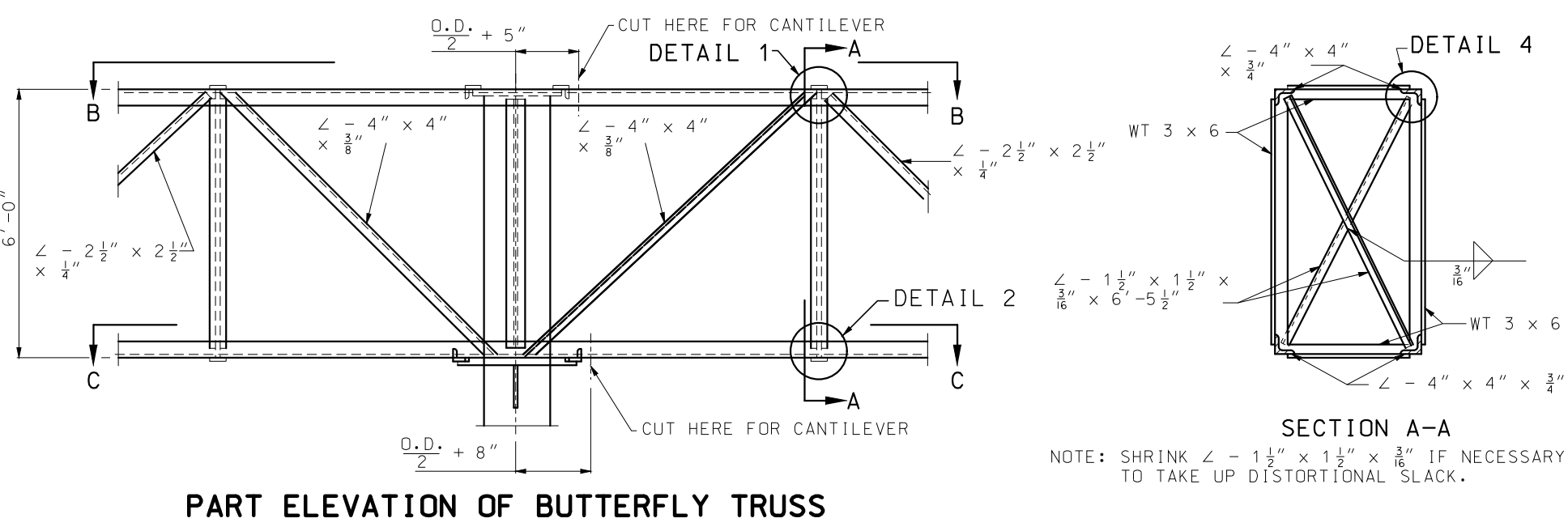
| | | |
|--|--|---------------------|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
|  | OVERHEAD SIGN TRUSSES BUTTERFLY AND CANTILEVER STRUCTURAL STEEL | |
| DATE EFFECTIVE: 10-01-2016 DATE PREPARED: 8/11/2016 | 903.12Z | SHEET NO. 1 OF 7 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



NOTE: 3/4" DIA. BOLTS SHALL BE REMOVED AFTER WELDING IS COMPLETE. BOLT HOLES SHALL BE PLUGGED AND THE OUTSIDE FACE GROUND SMOOTH.

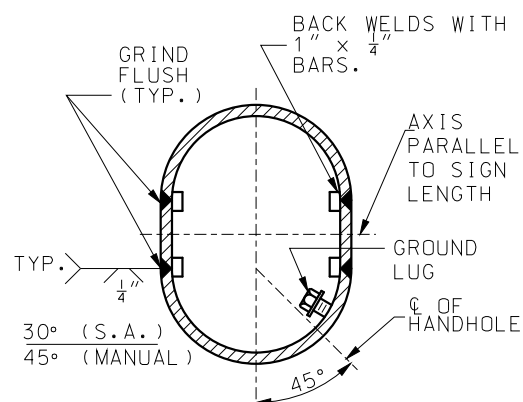
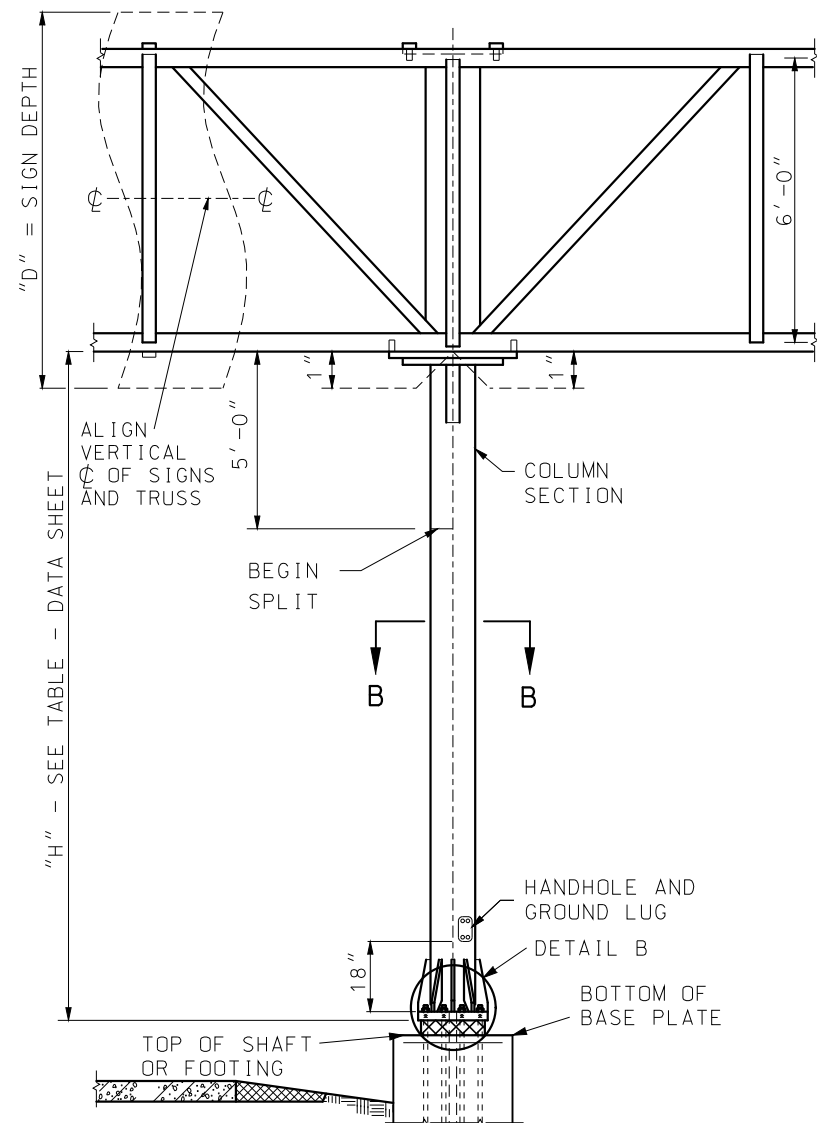
NOTE A: SPLICING CHORD ANGLES IN THE SHOP AND THE FIELD SPLICE SHOWN IN THIS SHEET WILL NOT BE ALLOWED WITHOUT SPECIAL PERMISSION. IF PERMISSION IS GRANTED SUCH SPLICES SHALL BE LOCATED AT THE CENTER LINE OF MAIN PANEL POINT NEXT TO COLUMN.



NOTE: SHRINK L - 1 1/2" x 1 1/2" x 3/16" IF NECESSARY TO TAKE UP DISTORTIONAL SLACK.

| | | |
|--|--|----------------|
| MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | | |
| | OVERHEAD SIGN TRUSSES BUTTERFLY & CANTILEVER STRUCTURAL STEEL | |
| | DATE EFFECTIVE: 10-01-2016 DATE PREPARED: 8/11/2016 | 903.12Z |

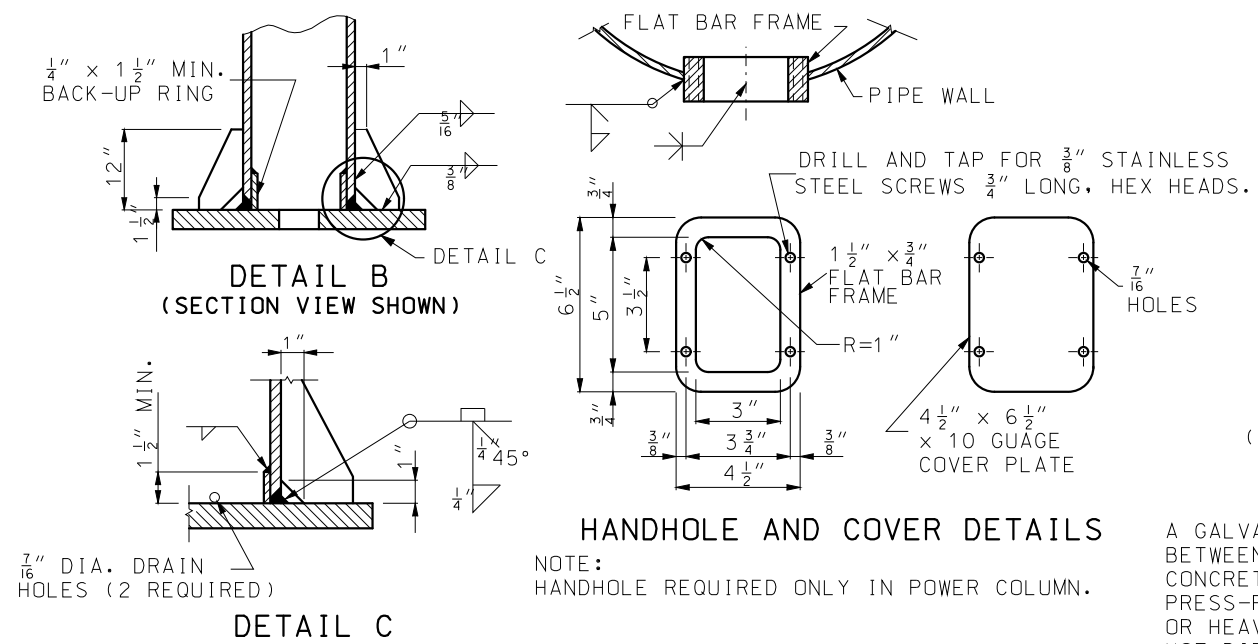
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



SECTION B-B
(FOR SPLIT COLUMNS ONLY)

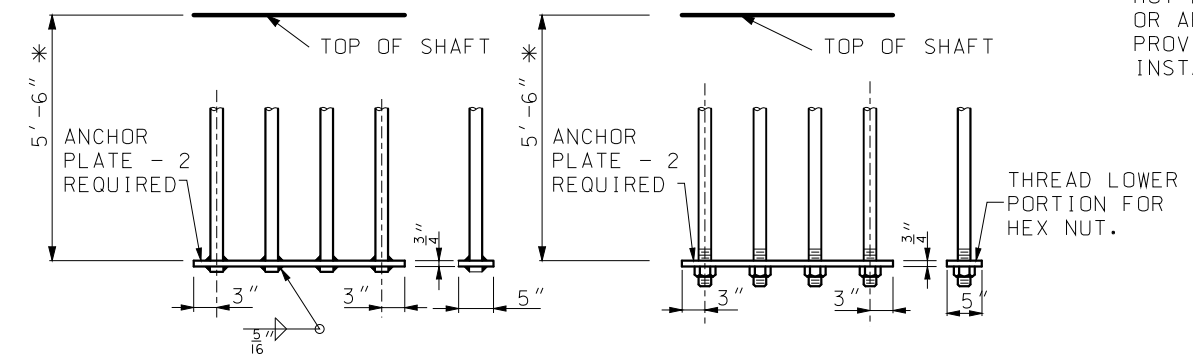
| TYPICAL BASE PLATE (10 ANCHOR TYPE) BUTTERFLY AND CANTILEVER (B.C.) | | | | | |
|---|-----|-----|---------|-----|---------|
| | III | IV | V | VI | VII |
| A | 8" | 9" | 8" | 9" | 10 1/2" |
| B | 10" | 10" | 10" | 10" | 11" |
| C | 32" | 34" | 32" | 34" | 38" |
| D | 13" | 14" | 16 1/2" | 18" | 20" |
| E | 32" | 34" | 39" | 42" | 46" |
| F | 6" | 6" | 6" | 6" | 6" |

NOTE:
FOR DETAILS OF OPTIONAL SUBSTRUCTURES,
SEE OTHER SHEETS.
ANCHOR BOLTS AND PLATE NOT SHOWN.



HANDHOLE AND COVER DETAILS

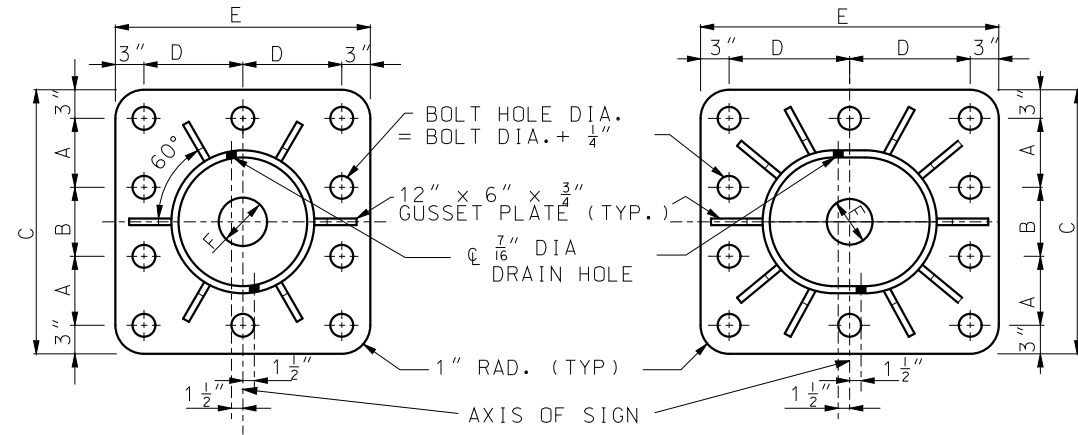
NOTE:
HANDHOLE REQUIRED ONLY IN POWER COLUMN.



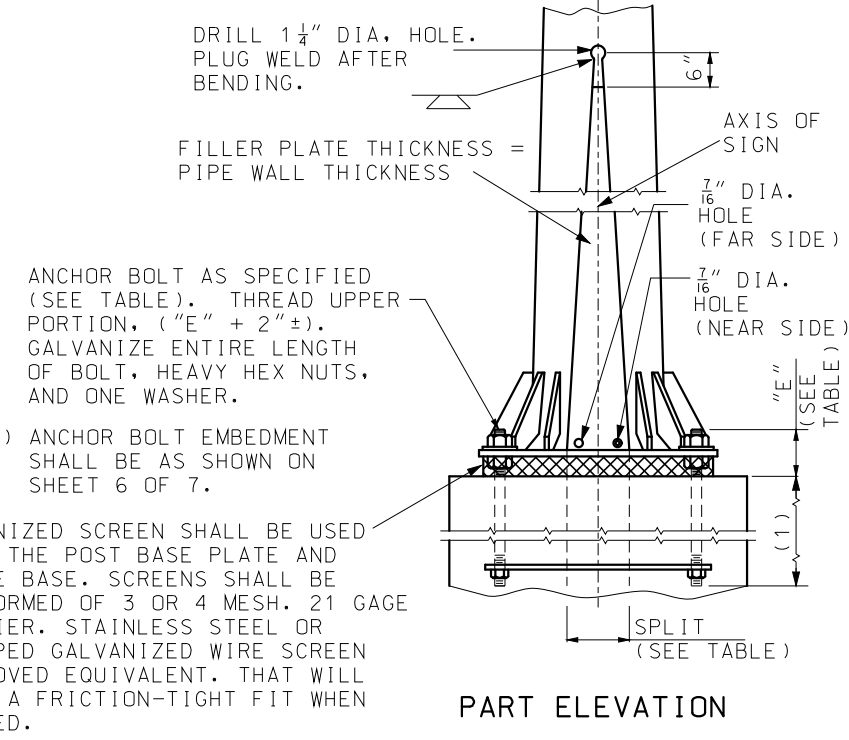
DETAIL A
ANCHORAGE

DETAIL A
OPTIONAL ANCHORAGE

(BOTH DETAILS ARE SHOWN FOR 4 BOLTS - SIMILAR FOR 3 BOLTS)
* DIMENSION SHOWN FOR DRILLED SHAFT OPTION. FOR SPREAD FOOTING
OPTION REFER TO SHEET 6 OF 7.



III AND IV B.C. TYPICAL BASE PLATES
V, VI, AND VII B.C. TYPICAL BASE PLATES



PART ELEVATION

GENERAL NOTES:

SUBSTRUCTURE SHALL BE BACKFILLED PRIOR TO ERECTION OF POST.

ASTM A 106 GRADE B STEEL PIPE OR A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B" SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE WELDED STEEL PIPE; A.S.T.M. SPECIFICATION A53.

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.

A HORIZONTAL WELDED SPLICE MAY BE FABRICATED IN THE COLUMN BETWEEN THE TOP OF PIPE AND 4'-0" BELOW THE BOTTOM CHORDS OF THE TRUSS WHEN DETAILED ON THE SHOP DRAWINGS AND APPROVED BY THE ENGINEER.

GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND HOLE.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE HORIZONTAL C OF THE TRUSS.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

**OVERHEAD SIGN TRUSS
COLUMN AND BASE PLATES**

DATE EFFECTIVE: 10-01-2016
DATE PREPARED: 8/11/2016

903.12Z

SHEET NO.
3 OF 7


IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| DRILLED SHAFT OPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | ALTERNATE PEDESTALS | | | |
|----------------------|-------------|---------------|------|-------|----------------------|-------------|------|--------|-------|--------|-------|-------|--------|----------------------|---------|----------|---------|---------|---------|---------------------|------|----------|---------|--------------------|---------------------|--------------------|--------|---------------------|--------|--|--|
| POST TYPE | PIPE COLUMN | | "E " | SPLIT | BASE PLATE SIZE** | ANCHOR BOLT | | C | FA | FB | FC | FD | FH | COLLAR REINFORCEMENT | | | | | | SHAFT REINFORCEMENT | | | | REBAR TOTAL (LBS.) | CON-CRETE (CU.YDS.) | REBAR TOTAL (LBS.) | | CONCRETE (CU.YDS.) | | | |
| | O.D. | WEIGHT (LBS.) | | | | NO. | DIA. | | | | | | | MOMENT-C1 | | SHEAR-C2 | | SKIN-C3 | | LONGITUDINAL S1 | | SHEAR-S2 | | | | TYPE A | TYPE C | TYPE A | TYPE C | | |
| | | | | | | | | | | | | | | BARS | SPACING | BARS | SPACING | BARS | SPACING | QUANTITY | BARS | BARS | SPACING | | | | | | | | |
| III | 18" | 93.45 | 8½" | 0" | 2'-8" x 2'-8" x 1¾" | 10 | 2" | 2'-10" | 4'-0" | 7'-6" | 1'-6" | 4'-6" | 14'-0" | #6 | 6" | #4 | 12" | #4 | 12" | 19 | #10 | #5 | 6" | 2126 | 12.4 | 2066 | 2077 | 13.4 | 14.5 | | |
| IV | 20" | 104.13 | 8½" | 0" | 2'-10" x 2'-10" x 2" | 10 | 2¼" | 3'-0" | 4'-0" | 7'-6" | 1'-6" | 4'-6" | 14'-0" | #6 | 6" | #4 | 12" | #4 | 12" | 19 | #10 | #5 | 6" | 2126 | 12.4 | 2066 | 2077 | 13.5 | 14.6 | | |
| V | 18" | 93.45 | 8½" | 7" | 3'-3" x 2'-8" x 2" | 10 | 2¼" | 2'-10" | 5'-0" | 13'-6" | 4'-0" | 5'-6" | 17'-0" | #6 | 6" | #4 | 12" | #4 | 12" | 22 | #11 | #6 | 6" | 3901 | 26.5 | 3763 | 3782 | 28.8 | 30.7 | | |
| VI | 20" | 104.13 | 8½" | 8" | 3'-6' x 2'-10" x 2¼" | 10 | 2¼" | 3'-0" | 5'-0" | 14'-0" | 4'-0" | 6'-0" | 18'-0" | #6 | 6" | #4 | 12" | #4 | 12" | 27 | #11 | #6 | 6" | 4742 | 31.8 | 4528 | 4547 | 34.1 | 36.2 | | |
| VII | 24" | 125.49 | 9" | 8" | 3'-10" x 3'-2" x 2¼" | 10 | 2½" | 3'-4" | 5'-0" | 14'-0" | 4'-0" | 6'-0" | 18'-0" | #6 | 6" | #4 | 12" | #4 | 12" | 27 | #11 | #6 | 6" | 4742 | 31.8 | 4528 | 4547 | 34.5 | 36.8 | | |

| SPREAD FOOTING OPTION | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|----------------|------------------|--------|-------|-------------------------|----------------|--------|--------------------|--------|-------------------|---------------------------------------|------|--------|------|---------------------------|------|-----|------|--------------------------|----------------------------|--|
| POST TYPE | PIPE COLUMN | | "E " | SPLIT | BASE PLATE SIZE** | ANCHOR BOLT | | PEDESTAL SIZE * | | FOOTING SIZE * | LONGITUDINAL FOOTING REINFORCEMENT | | | | PEDESTAL REINFORCEMENT | | | | REBAR TOTAL (LBS.) | CON- CRETE (CU.YDS.) | |
| | O.D. | WEIGHT (LBS.) | | | | NO. | DIA. | a | b | | TOP | | BOTTOM | | | | | | | | |
| | | | | | | | | | | | NO. | BARS | NO. | BARS | NO. | BARS | NO. | BARS | | | |
| III | 18" | 93.45 | 8 1/2" | 0" | 2'-8" x 2'-8" x 1 3/4" | 10 | 2" | 4'-2" | 3'-8" | 10'-0" x 13'-0" | 10 | #5 | 10 | #5 | 10 | #4 | 14 | #8 | 695 | 14.4 | |
| IV | 20" | 104.13 | 8 1/2" | 0" | 2'-10" x 2'-10" x 2" | 10 | 2 1/4" | 4'-4" | 3'-10" | 10'-0' x 14'-0" | 10 | #5 | 10 | #5 | 10 | #4 | 14 | #8 | 733 | 15.6 | |
| V | 18" | 93.45 | 8 1/2" | 7" | 3'-3" x 2'-8" x 2" | 10 | 2 1/4" | 4'-9" | 3'-8" | 9'-0" x 17'-0" | 9 | #5 | 10 | #7 | 10 | #4 | 14 | #8 | 955 | 16.5 | |
| VI | 20" | 104.13 | 8 1/2" | 8" | 3'-6' x 2'-10" x 2 1/4" | 10 | 2 1/4" | 5'-0" | 3'-10" | 9'-0" x 19'-0" | 9 | #5 | 10 | #7 | 10 | #4 | 14 | #8 | 1028 | 18.4 | |
| VII | 24" | 125.49 | 9" | 8" | 3'-10" x 3'-2" x 2 1/4" | 10 | 2 1/2" | 5'-4" | 4'-2" | 10'-0" x 20'-0" | 9 | #5 | 12 | #7 | 10 | #4 | 14 | #8 | 1196 | 21.5 | |

| SPREAD FOOTING OPTION WITH ALTERNATE PEDESTALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------|---------------|------|-------|----------------------|-------------|------|-----------------|--------|-----|-----------------|---|------|--------|------|-------------------------------|------|-----|------|---------------------------|---------------------------|---|------|-----|------|-------------------------------|------|-----|------|---------------------------|---------------------------|-----|------|-----|------|
| POST TYPE | PIPE COLUMN | | "E " | SPLIT | BASE PLATE SIZE** | ANCHOR BOLT | | PEDESTAL SIZE * | | | FOOTING SIZE * | TYPE A LONGITUDINAL FOOTING REINFORCEMENT | | | | TYPE A PEDESTAL REINFORCEMENT | | | | TYPE A REBAR TOTAL (LBS.) | TYPE A CONCRETE (CU.YDS.) | TYPE C LONGITUDINAL FOOTING REINFORCEMENT | | | | TYPE C PEDESTAL REINFORCEMENT | | | | TYPE C REBAR TOTAL (LBS.) | TYPE C CONCRETE (CU.YDS.) | | | | |
| | O.D. | WEIGHT (LBS.) | | | | NO. | DIA. | c | d | e | | TOP | | BOTTOM | | NO. | BARS | NO. | BARS | | | NO. | BARS | NO. | BARS | NO. | BARS | NO. | BARS | | | NO. | BARS | NO. | BARS |
| | | | | | | | | | | | | NO. | BARS | NO. | BARS | | | | | | | | | | | | | | | | | | | | |
| III | 18" | 93.45 | 8½" | 0" | 2'-8" x 2'-8" x 1¾" | 10 | 2" | 2'-10" | 6'-6" | 15" | 10'-0" x 13'-0" | 10 | #5 | 10 | #5 | 10 | #4 | 14 | #8 | 757 | 14.4 | 10 | #4 | 10 | #5 | 12 | #4 | 14 | #8 | 800 | 15.3 | | | | |
| IV | 20" | 104.13 | 8½" | 0" | 2'-10" x 2'-10" x 2" | 10 | 2¼" | 3'-0" | 6'-9" | 18" | 10'-0' x 14'-0" | 10 | #5 | 10 | #5 | 10 | #4 | 14 | #8 | 795 | 15.6 | 10 | #4 | 10 | #5 | 12 | #4 | 14 | #8 | 839 | 16.5 | | | | |
| V | 18" | 93.45 | 8½" | 7" | 3'-3" x 2'-8" x 2" | 10 | 2¼" | 2'-10" | 7'-0" | 12" | 9'-0" x 17'-0" | 9 | #5 | 10 | #7 | 10 | #4 | 14 | #8 | 1015 | 16.5 | 10 | #4 | 10 | #7 | 12 | #4 | 14 | #8 | 1059 | 17.5 | | | | |
| VI | 20" | 104.13 | 8½" | 8" | 3'-6' x 2'-10" x 2¼" | 10 | 2¼" | 3'-0" | 7'-6" | 15" | 9'-0" x 19'-0" | 9 | #5 | 10 | #7 | 10 | #4 | 14 | #8 | 1099 | 18.4 | 10 | #4 | 10 | #7 | 12 | #4 | 14 | #8 | 1134 | 19.5 | | | | |
| VII | 24" | 125.49 | 9" | 8" | 3'-10" x 3'-2" x 2¼" | 10 | 2½" | 3'-4" | 7'-10" | 15" | 10'-0" x 20'-0" | 9 | #5 | 12 | #7 | 10 | #4 | 14 | #8 | 1257 | 21.5 | 10 | #4 | 12 | #7 | 12 | #4 | 14 | #8 | 1302 | 22.6 | | | | |

* BASE PLATES, PEDESTAL AND FOOTINGS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.
** BASE PLATES, PEDESTAL AND FOUNDATIONS, LONGER SIDES SHALL BE NORMAL TO AXIS OF SIGN.



MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI

EILEEN H. RACKERS

NUMBER PE-28336

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10-01-2016

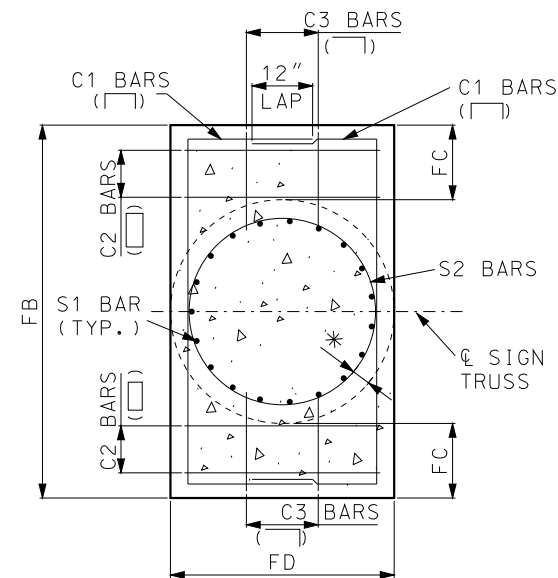
DATE PREPARED: 8/11/2016

903.12Z

SHEET NO. 4 OF 7

OVERHEAD SIGN TRUSSES
OPTIONAL SUBSTRUCTURE DATA

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

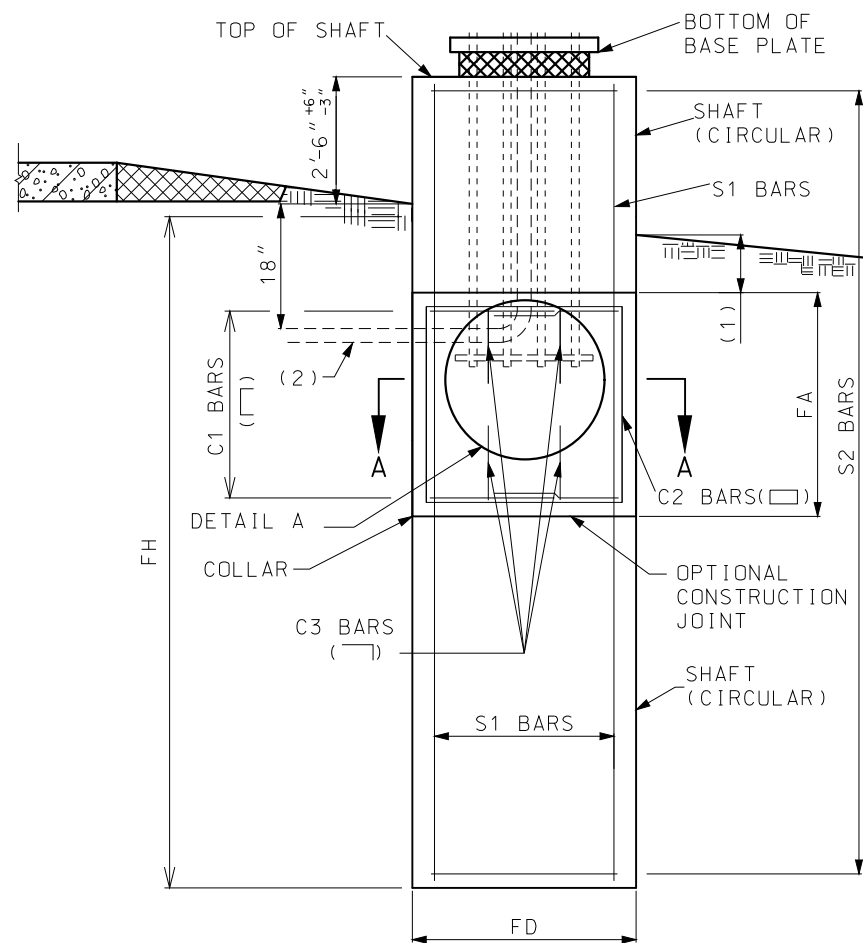


SECTION A-A

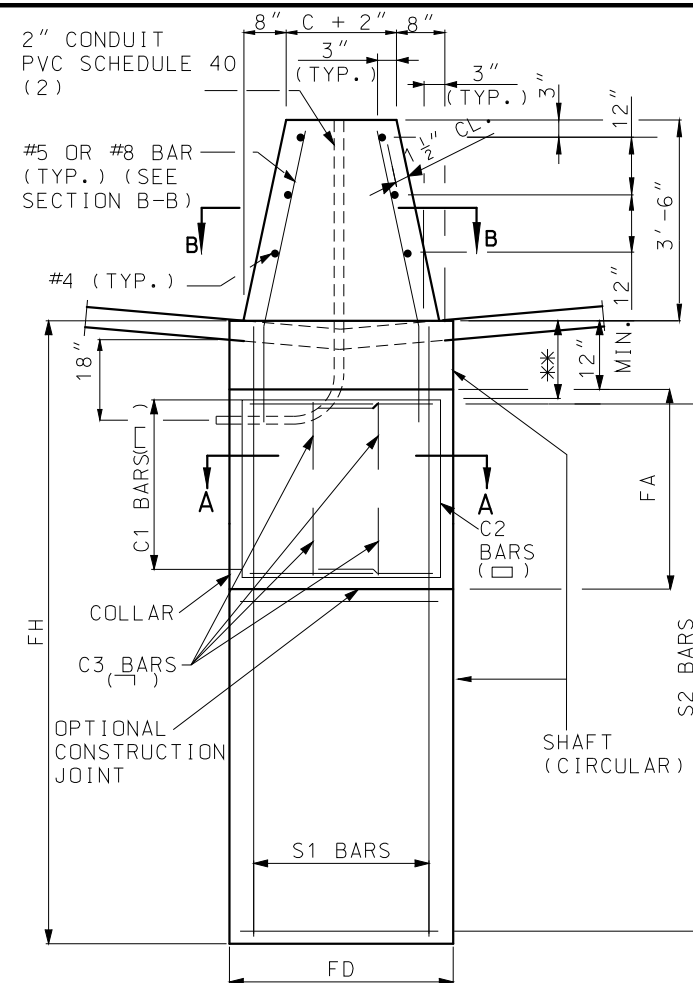
(TYPICAL SECTION SHOWING REINFORCING STEEL)

* 4" CLEAR FOR $FD = 4'-6"$
6" CLEAR FOR $FD > 4'-6"$

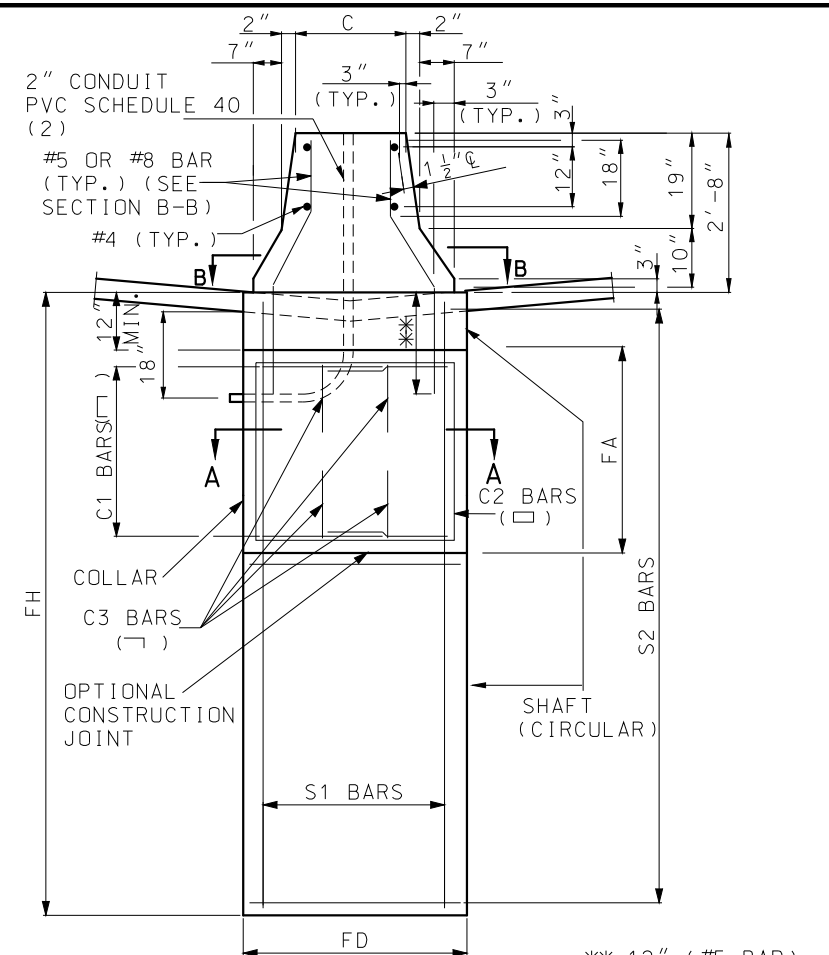
VERTICAL LEG OF C3 SHALL BE PLACED INSIDE SHAFT S2 BARS.



ELEVATION



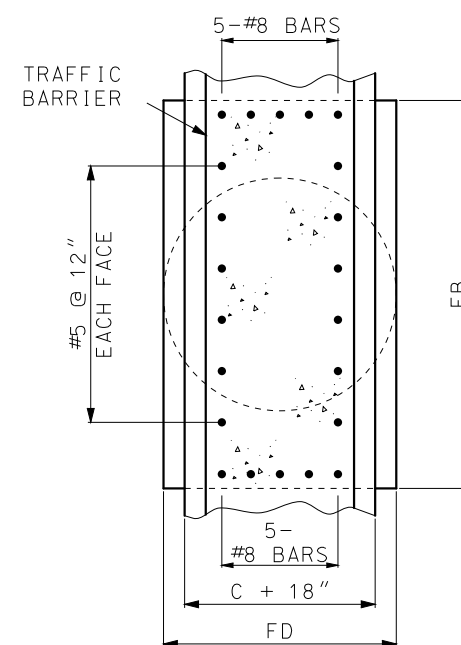
**PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)**



**PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)**

** 12" (#5 BAR)
2'-4" (#8 BAR)

DETAILS OF ALTERNATE PEDESTAL (TO BE USED ADJACENT TO TYPE A OR TYPE C MEDIAN BARRIER)



SECTION B-B

GENERAL NOTES:



SHAFT AND COLLAR SHALL BE CLASS B (P.C.C.).

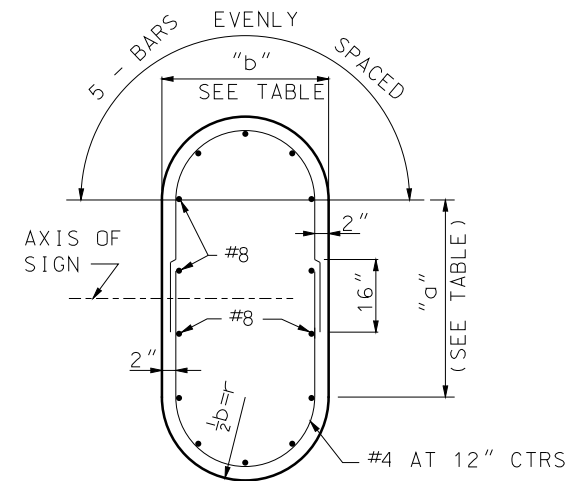
MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

WHEN ROCK IS ENCOUNTERED AT A DEPTH NOT EXCEEDING "FH"/2 FOR $FD > 3'-0"$ OR "FH"/4 FOR $FD \leq 3'-0"$, THE DIMENSION "FH" MAY BE ADJUSTED TO A MINIMUM OF 3 X "FD", SUBJECT TO APPROVAL BY THE ENGINEER.

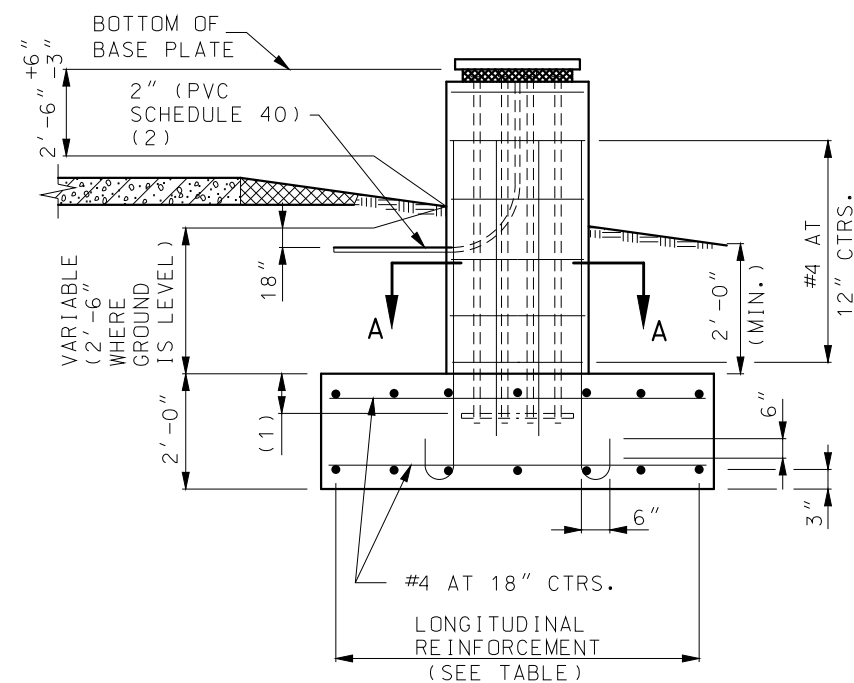
CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  <p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>OVERHEAD SIGN TRUSSES DRILLED SHAFT OPTION</p> |
| DATE EFFECTIVE: 10-01-2016 DATE PREPARED: 8/11/2016 | <p>903.12Z</p> |
| SHEET NO. 5 OF 7 | |

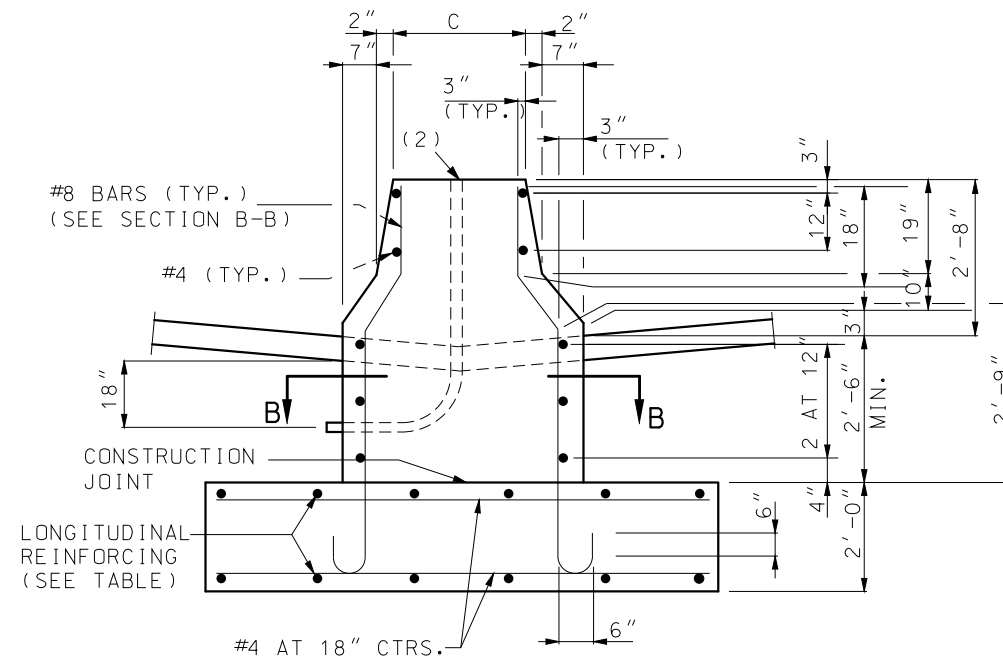


SECTION A-A
(TYPICAL SECTION SHOWING REINFORCING STEEL)

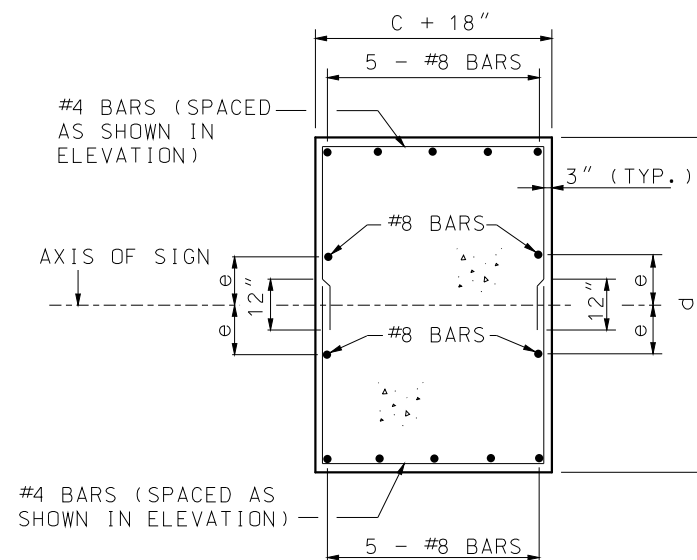


ELEVATION

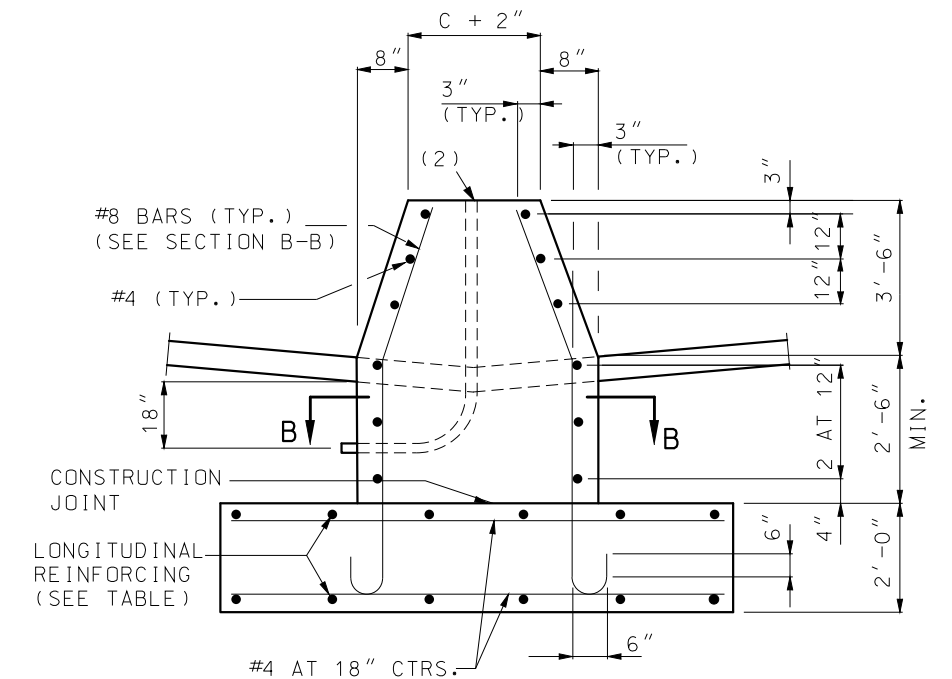
- (1) $12'' + \frac{6}{3}''$ (DETAIL FOR 12" FIELD TOLERANCE)
- (2) 2" CONDUIT IN THE CONCRETE PEDESTAL SHALL BE PVC SCHEDULE 40 AND SHALL BE PLACED WITH A MINIMUM BEND RADIUS OF $9\frac{1}{2}''$.



PART ELEVATION
(TYPE A CONCRETE TRAFFIC BARRIER)



SECTION B-B
TYPICAL SECTION SHOWING
REINFORCING STEEL
DETAILS OF ALTERNATE PEDESTAL



PART ELEVATION
(TYPE C CONCRETE TRAFFIC BARRIER)



GENERAL NOTES:

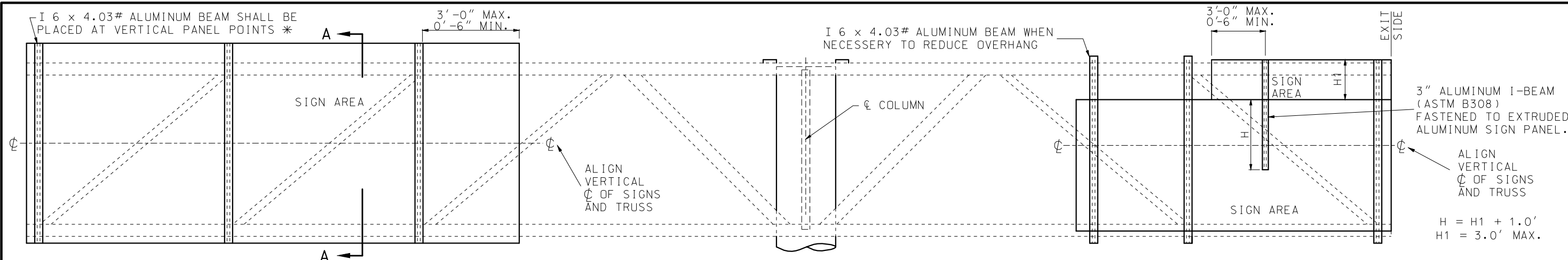
PEDESTAL AND FOOTING SHALL BE CLASS B (P.C.C.).

MINIMUM CLEARANCE TO REINFORCEMENT IS 3" EXCEPT AS SHOWN.

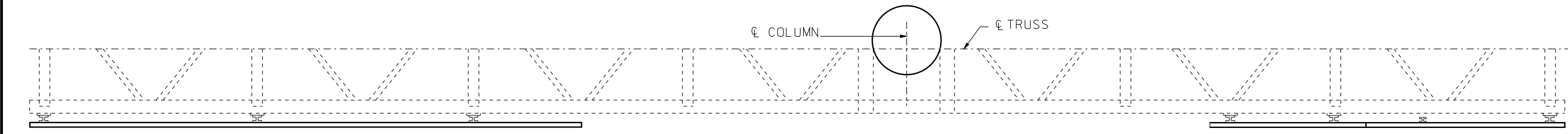
CONTACT THE ENGINEER IF WATER TABLE IS ENCOUNTERED DURING EXCAVATION.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES PERTAINING TO THESE ITEMS HAVE BEEN OMITTED FOR CLARITY. REFER TO SHEET 3 OF 7 FOR DETAILS OF THESE ITEMS.

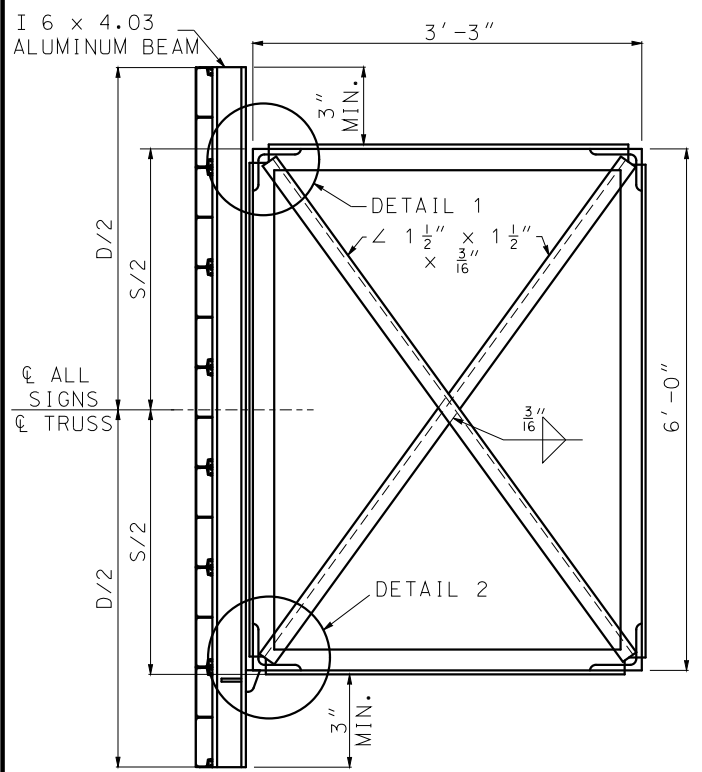
| | |
|--|--|
|  <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
|  <p>STATE OF MISSOURI EILEEN H. RACKERS NUMBER PE-28336 PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p>OVERHEAD SIGN TRUSSES</p> <p>SPREAD FOOTING</p> |
| <p>DATE EFFECTIVE: 10-01-2016</p> <p>DATE PREPARED: 8/11/2016</p> | <p>903.12Z</p> |
| <p>SHEET NO. 6 OF 7</p> | |



TYPICAL ELEVATION OF SIGNS COMPONENTS



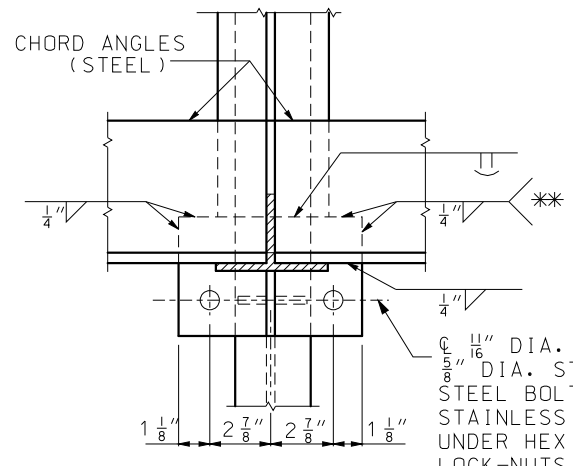
TYPICAL PLAN OF SIGN COMPONENTS



SECTION A-A
TYPICAL SECTION
OF SIGN SUPPORT

NOTE:
"D" = GREATEST OVERALL DEPTH
OF ANY SIGNS ON TRUSSES.

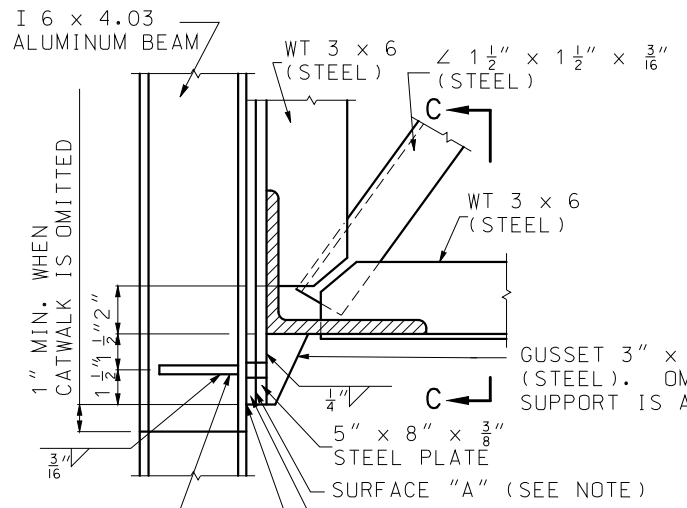
TWO - GUSSETS 5" x 1" x $\frac{3}{8}$ "
(ALUM.) OMIT WHEN NOT USED FOR
CATWALK SUPPORT.



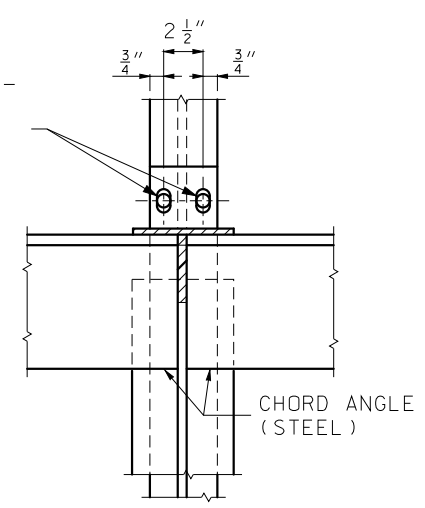
SECTION C-C

$\frac{9}{16}$ " DIA. HOLES IN
ALUMINUM FLANGE.
 $\frac{9}{16}$ " x 1" SLOT IN
CL FOR $\frac{1}{2}$ " DIA. STAIN-
LESS STEEL HEX HEAD
BOLTS AND LOCK-NUTS
WITH FLAT STAINLESS
STEEL WASHERS.

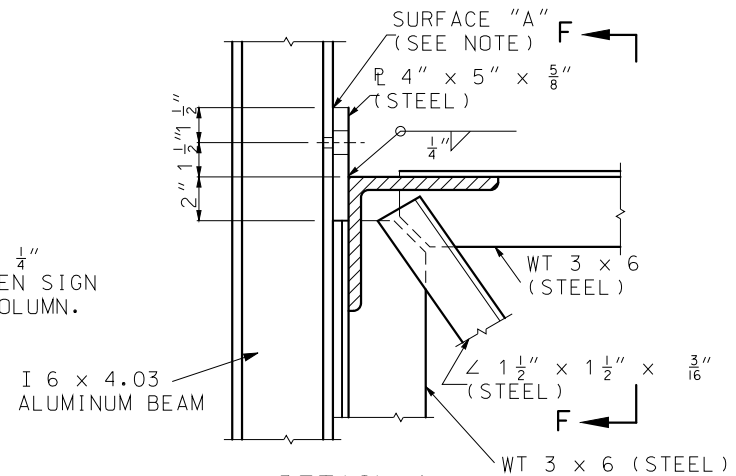
$\frac{11}{16}$ " DIA. HOLES FOR
 $\frac{3}{4}$ " DIA. STAINLESS
STEEL BOLTS WITH
STAINLESS STEEL WASHERS
UNDER HEX HEADS AND
LOCK-NUTS.



DETAIL 2



SECTION F-F



DETAIL 1

NOTE:
SURFACE "A", ZINC CHROMATE ON ALUMINUM SURFACES.
NORMAL CLEANING AND PAINTING ON STEEL SURFACES.
ZINC CHROMATE IS NOT REQUIRED WHEN STEEL IS
GALVANIZED.

* FOR SIGN HEIGHTS GREATER THAN 17'-0", BUT LESS
THAN OR EQUAL TO 20'-0" USE ADDITIONAL I 6 x 4.03
ALUMINUM BEAMS TO ACHIEVE A MAXIMUM SPACING OF
4'-0" BETWEEN SIGN SUPPORTS.

** WHEN SIGN SUPPORTS ARE PLACED BETWEEN VERTICAL
PANEL POINTS AS ILLUSTRATED IN TYPICAL ELEVATION
OF SIGNS COMPONENTS, WELD THE $\frac{3}{8}$ " STEEL PLATE
TO THE BOTTOM CHORD WITH A $\frac{1}{4}$ " FILLET WELD.

GENERAL NOTES:

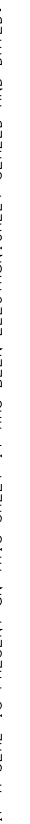
EXIT NO. PANELS SHALL BE MONTED FLUSH WITH THE EXIT
SIDE OF THE GUIDE SIGN.

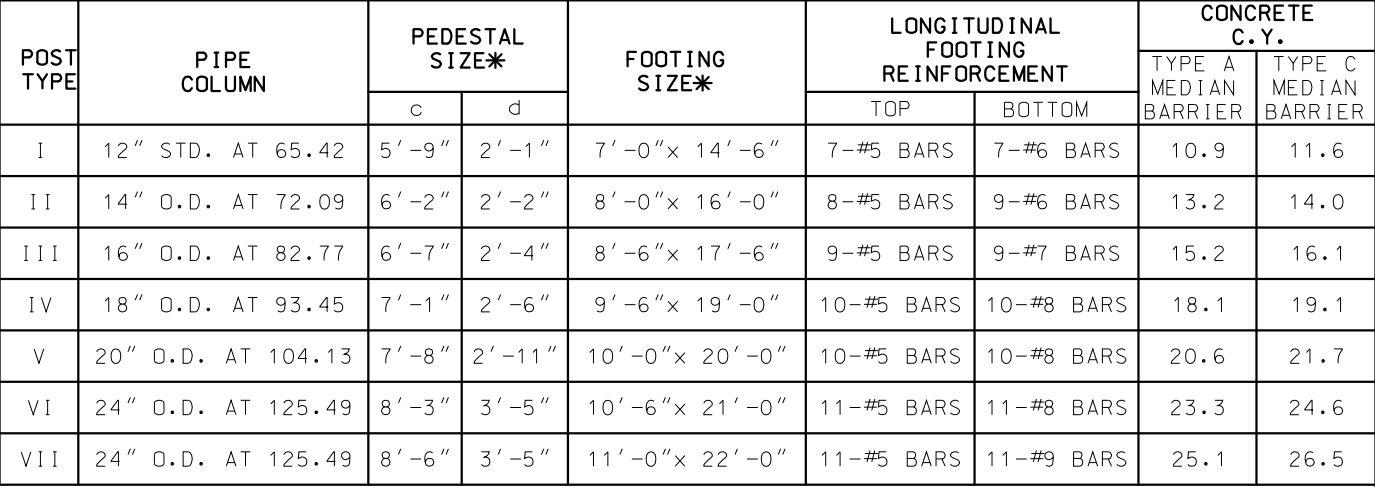
ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE
HORIZONTAL CL OF THE TRUSS.

FOR SIGN MOUNTING DETAILS, SEE STANDARD PLANS 903.03.

| | |
|---|--|
| <p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p> | |
| | <p>OVERHEAD SIGN TRUSSES</p> <p>STRUCTURAL STEEL BUTTERFLY AND CANTILEVER</p> |
| <p>DATE EFFECTIVE: 10-01-2016</p> <p>DATE PREPARED: 8/11/2016</p> | <p>903.12Z</p> <p>SHEET NO. 7 OF 7</p> |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.





GENERAL NOTES:

A TAPERED TUBE OF EQUIVALENT SIZE AND THICKNESS MAY BE SUBSTITUTED FOR PIPE POST.

ALL STEEL PIPE COLUMNS SHALL BE EITHER GRADE "B"
SEAMLESS STEEL PIPE OR GRADE "B" ELECTRIC RESISTANCE
WELDED STEEL PIPE; A.S.T.M. SPECIFICATION A53.

NO OBJECTIONABLE SEAMS WILL BE PERMITTED.

ALL STRUCTURES SHALL BE GROUNDED.

BURR THREADS ON ALL ANCHOR BOLTS.

PIPE COLUMN, BASE PLATE, ANCHOR BOLTS AND NOTES
PERTAINING TO THESE ITEMS HAVE BEEN OMITTED
FOR CLARITY. REFER TO SHEET 3 OF 5 FOR DETAILS OF
THESE ITEMS.



GROUND LUGS SHALL BE LOCATED INSIDE COLUMN NEAR HAND
HOLE.

QUANTITIES FOR PEDESTAL ARE BASED ON NOMINAL HEIGHT OF 5'-2" (TYPE A MEDIAN BARRIER) OR 6'-0" (TYPE C MEDIAN BARRIER).

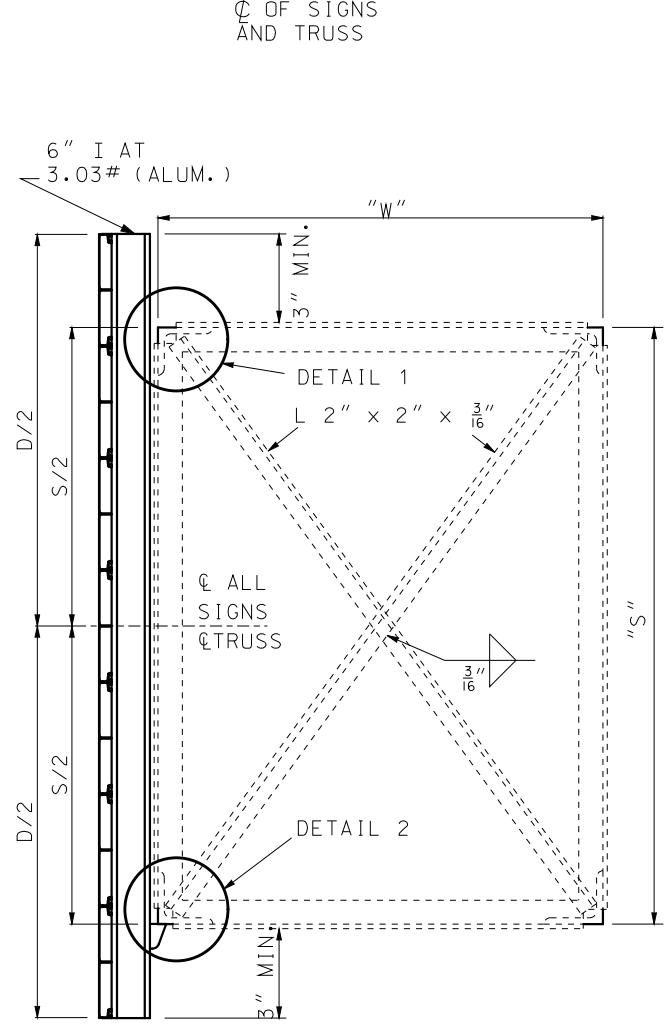
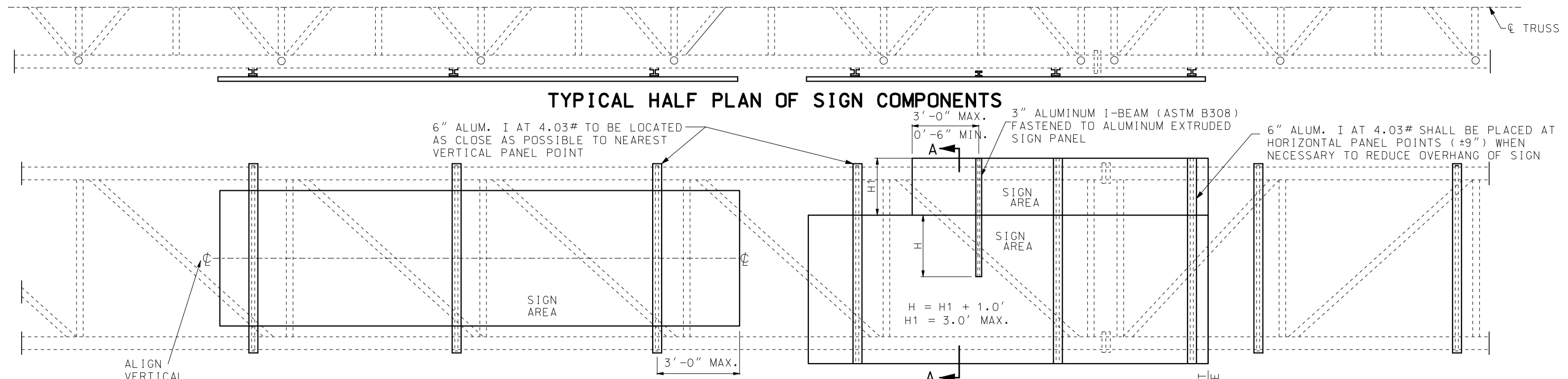
QUANTITIES FOR FOOTING ARE BASED ON NOMINAL DEPTH OF 2'-0".

QUANTITIES SHOWN ARE FOR ONE COLUMN ONLY.



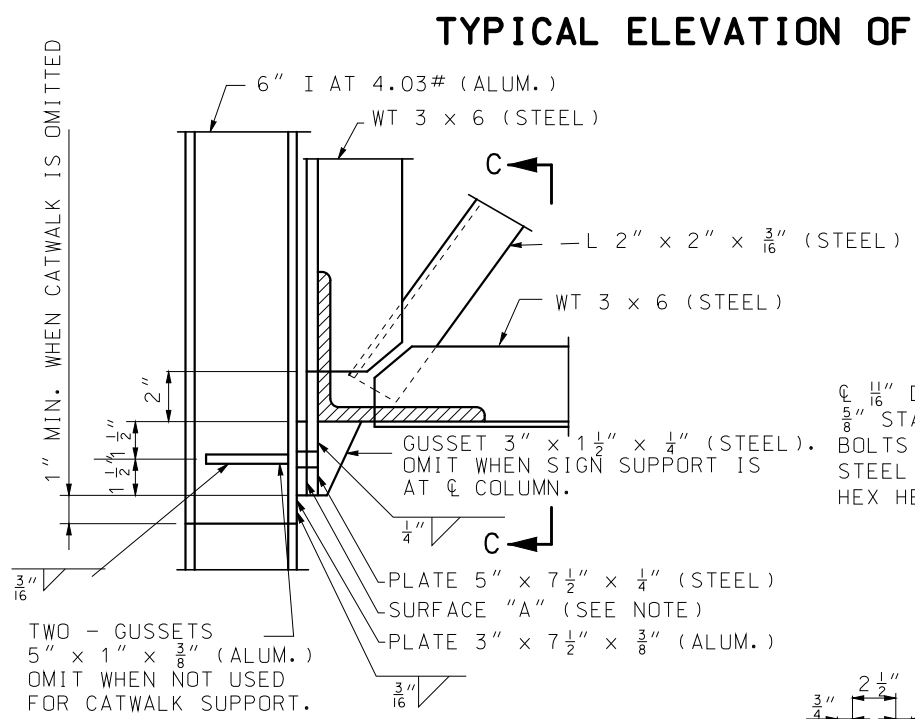
| | | | |
|---|--|--|---------------------|
|  | | MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| | | 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | <h1 style="text-align: center;">OVERHEAD SIGN TRUSSES</h1> <h2 style="text-align: center;">STRUCTURAL STEEL</h2> | | |
| THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY. | | | |
| DATE EFFECTIVE: | <u>10/01/2016</u> | | |
| DATE PREPARED: | <u>8/11/2016</u> | 903.60AB | SHEET NO. 4 OF 5 |

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

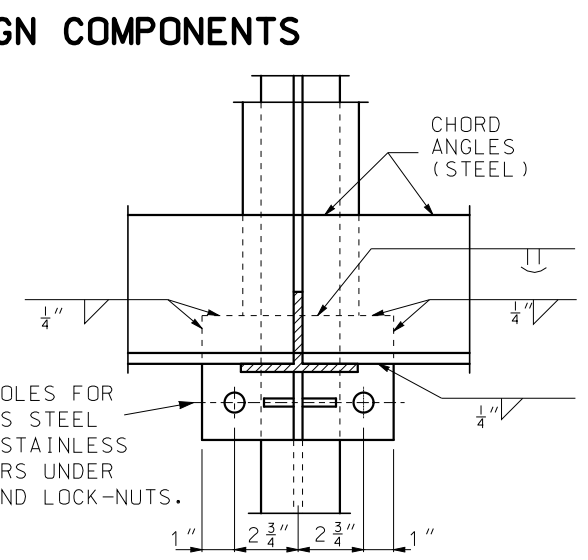


SECTION A-A
TYPICAL SECTION OF SIGN SUPPORT

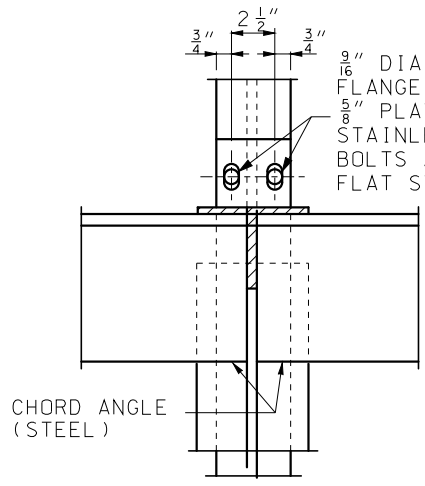
NOTE: "D" = GREATEST OVERALL DEPTH OF ANY SIGN OR SIGNS ON TRUSSES AND
"S" = TRUSS DEPTH. SEE SHEET NO. 5 OF 7 FOR LOCATION OF SECTION A-A.



DETAIL 2

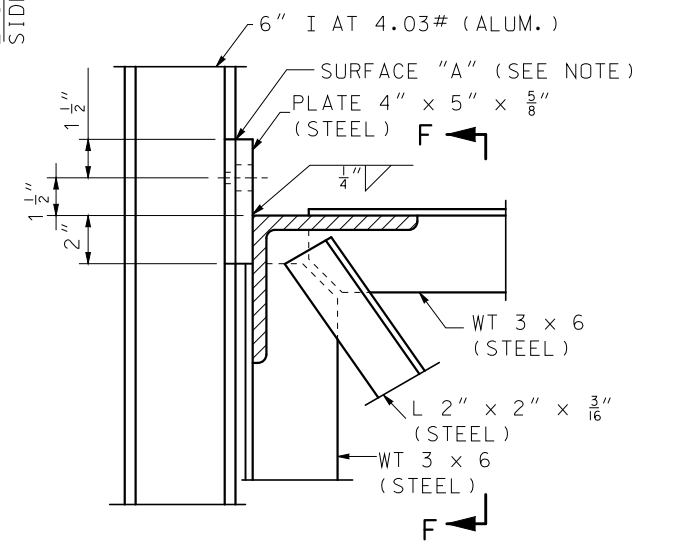


SECTION C-C



SECTION F-F

NOTE:
SURFACE "A", ZINC CHROMATE
ON ALUMINUM SURFACES.
NORMAL CLEANING AND PAINTING
ON STEEL SURFACES. ZINC
CHROMATE IS NOT REQUIRED
WHEN STEEL IS GALVANIZED.


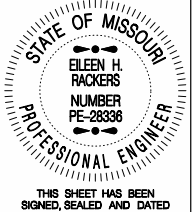


DETAIL 1

GENERAL NOTES:

EXIT NO. PANELS SHALL BE MOUNTED FLUSH WITH THE EXIT
SIDE OF THE GUIDE SIGN.

ALL SIGNS SHALL BE CENTERED VERTICALLY ABOUT THE
HORIZONTAL C OF THE TRUSS.

| | |
|--|--|
|  MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION | |
| 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636) | |
|  | OVERHEAD SIGN TRUSSES STRUCTURAL STEEL |
| DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016 | 903.60AB |
| SHEET NO. 5 OF 5 | |